Customer Care Solutions
NHM-4 Series Transceivers

Disassembly and Troubleshooting Instructions

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NHM-4 Disassembly Instructions 5
Phone disassembly steps 5
Reassembly 19
Bluetooth module removal and reassembly 20
Transceiver Troubleshooting 25
Test points 25
SIM test points 25
Bluetooth test points 26
Power test points 28
LCD, RF and Flash test points 29
Miscellaneous test points 31
Flash programming and RF power supply test points 32
Troubleshooting steps 35
Main troubleshooting tree, 1 36
Main troubleshooting tree, 2 37
Main troubleshooting tree, 3 38
Keypad troubleshooting 2 55
RF Troubleshooting 59
Introduction 59
Transmitter 59
Transmitter troubleshooting diagram 61
Hagar troubleshooting 62
PA & Antenna switch troubleshooting 63
Transmitter signals 64
Receiver 65
Receiver troubleshooting diagram for GSM900 67
Receiver troubleshooting diagram for GSM1800 68
LNA gangster checking GSM900 & GSM1800 69
Synthesizer 70
Synthesizer troubleshooting diagram 71
Synthesizer signals 72

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NHM-4 Disassembly Instructions

Phone disassembly steps

Take ESD precautions!

Figure 1: Anti-ESD strap donned

Open the phone slide.

Figure 2: Slide opening

Remove the battery cover: open it.

Figure 3: Battery cover latch pressed

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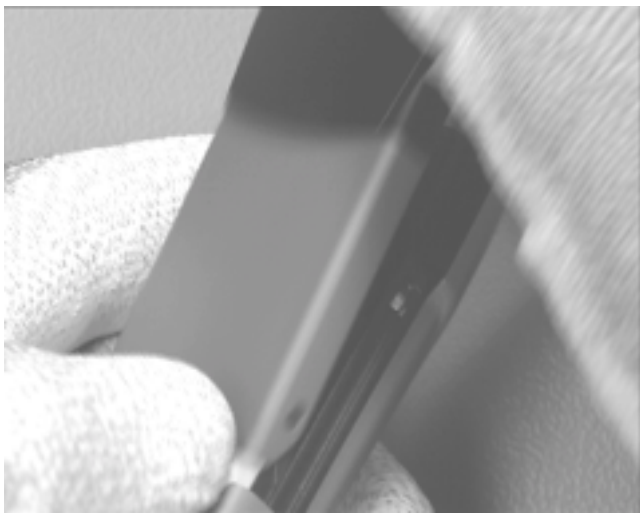
Lift up the battery cover

Figure 4: Battery cover lifted up

Remove the battery cover.

Figure 5: Battery cover removal



Remove the battery.

Figure 6: Battery removal

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Remove the logo plate: Push the grip downwards at the logo plate -

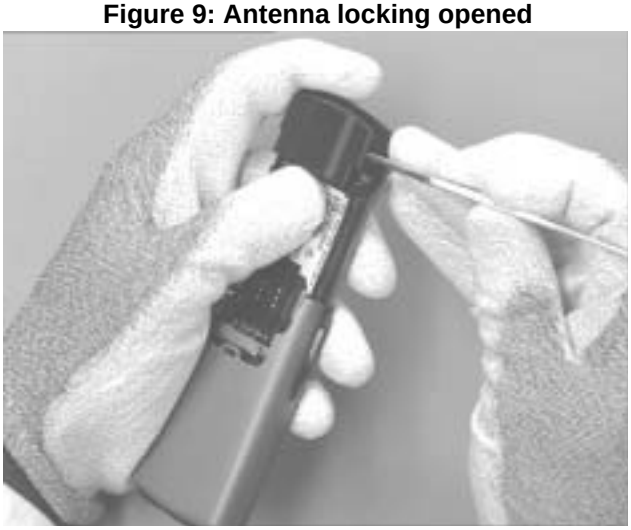
Figure 7: Grip pressed down

- and at the same time push the logo plate off.

Figure 8: Logo plate removal

Remove the antenna: open the locking.

Figure 9: Antenna locking opened



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Lift off the antenna.

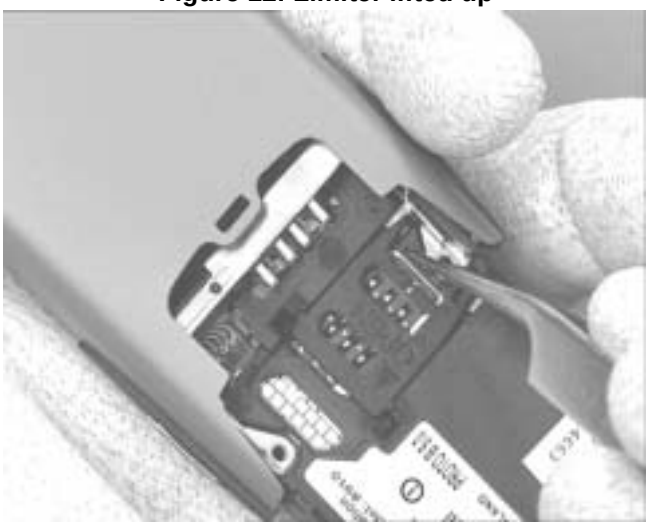
Figure 10: Antenna removal 2

Open the two limiter screws

Figure 11: Limiter screws opened

Lift up the limiter from the two screw towers.

Figure 12: Limiter lifted up



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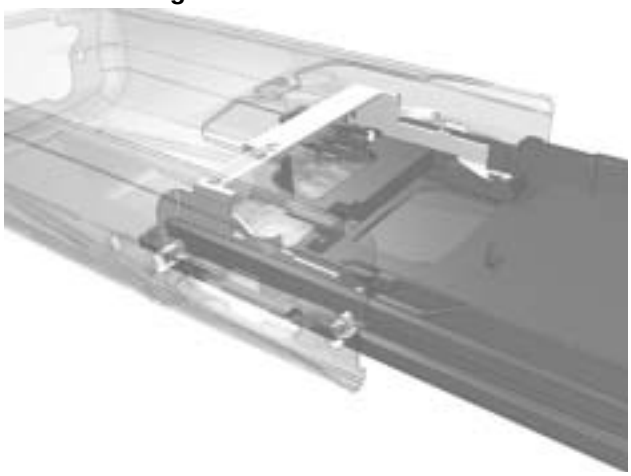
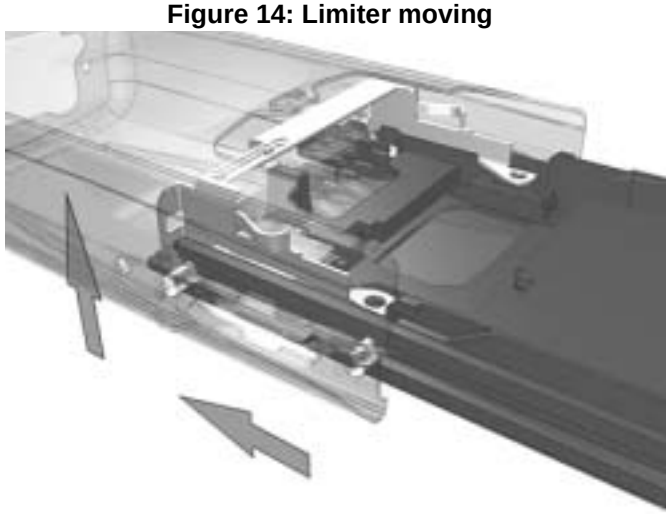
The limiter shown here:

Figure 13: Limiter shown



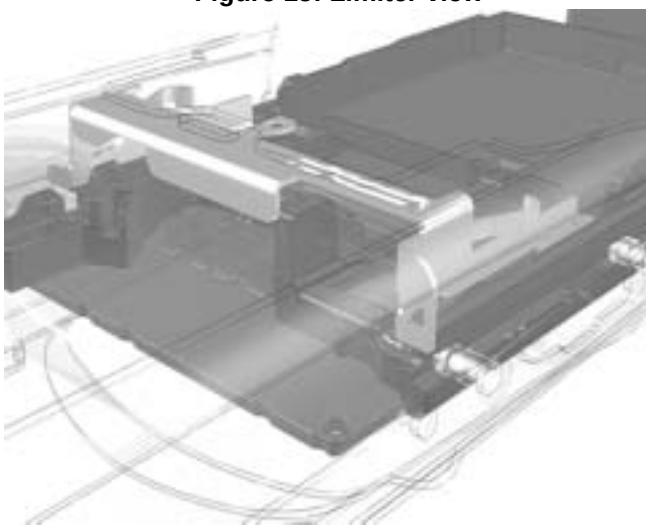
Push the limiter backwards and up.

Figure 14: Limiter moving



Limiter seen from another angle

Figure 15: Limiter view



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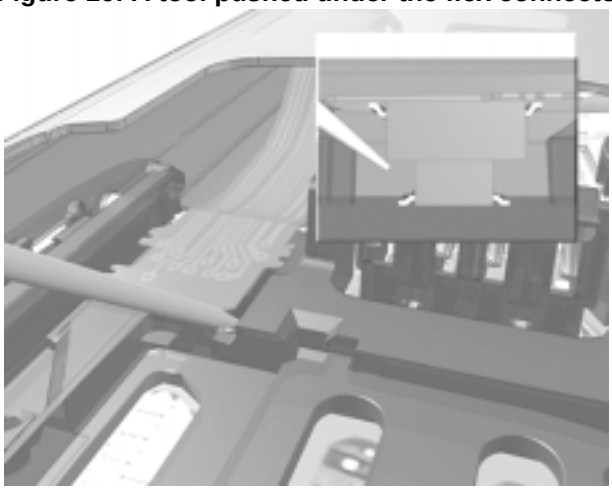
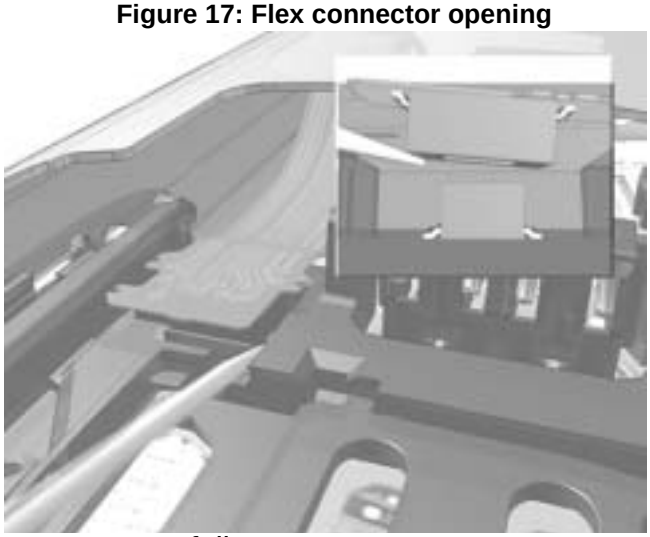
Open the flex connector: push a tool under the flex connector from the short side corner of the connector -

Figure 16: A tool pushed under the flex connector



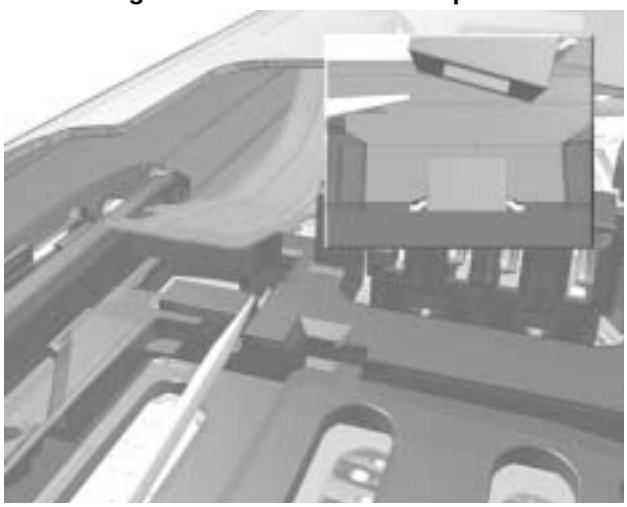
- and twist

Figure 17: Flex connector opening



Lift the connector up carefully

Figure 18: Flex connector opened



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The flex connector opening in practice: insert tool -

Figure 19: Flex connector opening 1

- twist

Figure 20: Flex connector opening 2

- and lift up carefully

Figure 21: Flex connector opened

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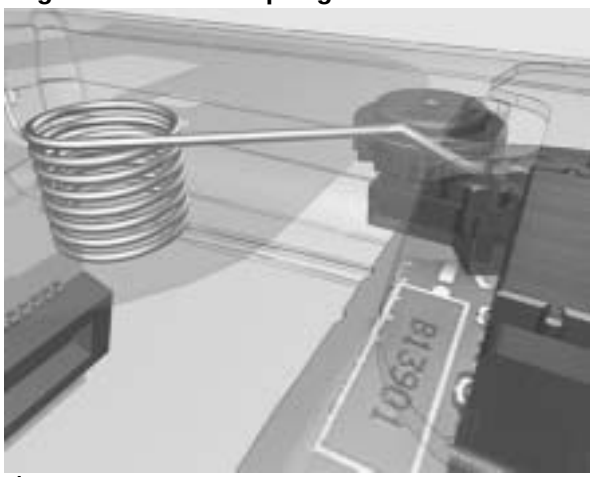
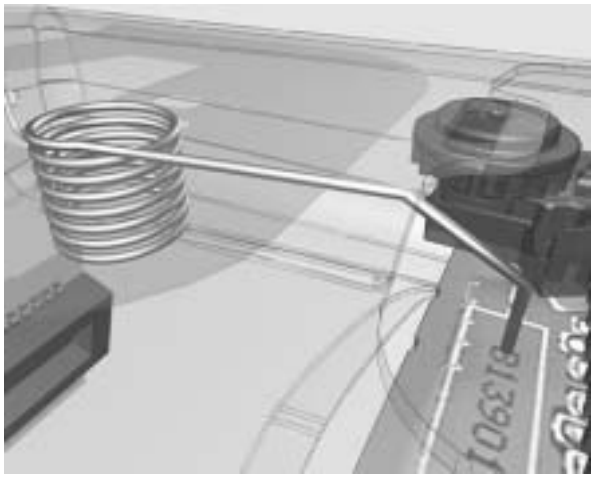
Lift the torsion spring from its slot.

Figure 22: Torsion spring lifted from slot



The spring is lifted.

Figure 23: Torsion spring lifted



Pull the engine module carefully from the grip.

Figure 24: Engine module pulling from the grip

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Note: avoid bending the limiter when pulling out the engine module.

Figure 25: Engine module removed from the grip

Remove the limiter.

Figure 26: Limiter removed

Remove the four screws holding the engine with the A-cover.

Figure 27: Preparing to remove four screws

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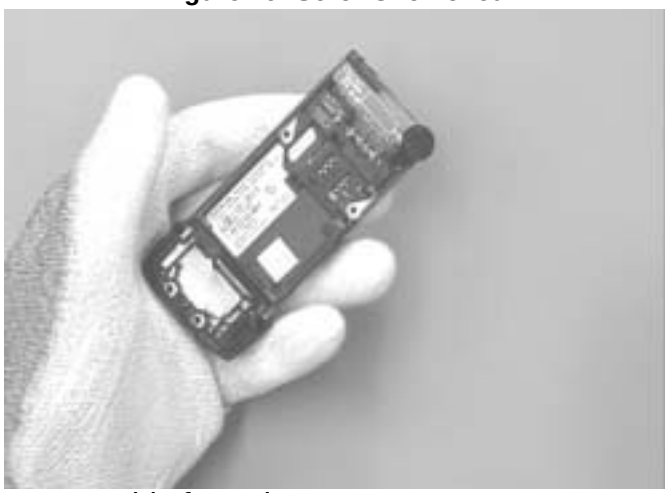
Open the screws.

Figure 28: Opening screws

The four screws are removed, note holes

Figure 29: Screws removed



Lift the engine assembly from the A- cover

Figure 30: Engine removed

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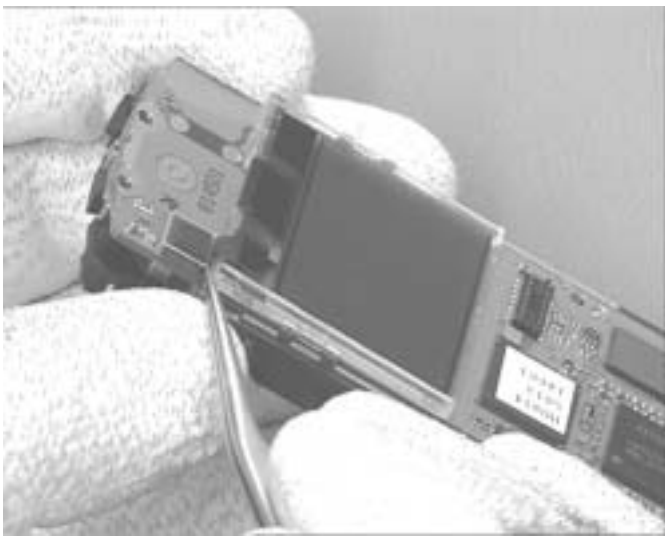
Removed the LCD. Open the board-to-board connector, first on one side -

Figure 31: B-to-b connector opened from one side



- and then from the other side.

Figure 32: B-to-b connector opened from the other side

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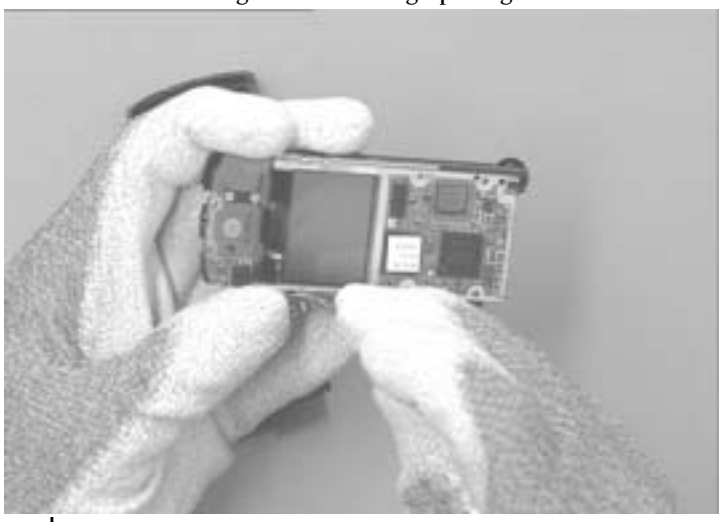
Open the locking to the shield by pressing the locking clip with a flat screw-driver.

Figure 33: Locking opening

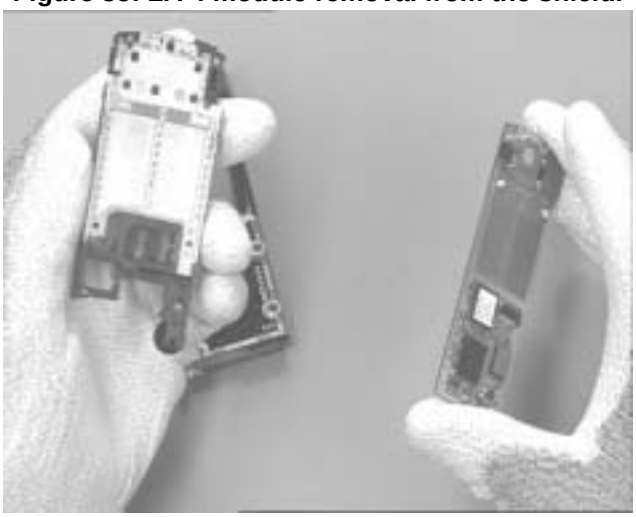


LCD removed.

Figure 34: LCD removed

Remove the system module LA4 off the shield.

Figure 35: LA 4 module removal from the shield.



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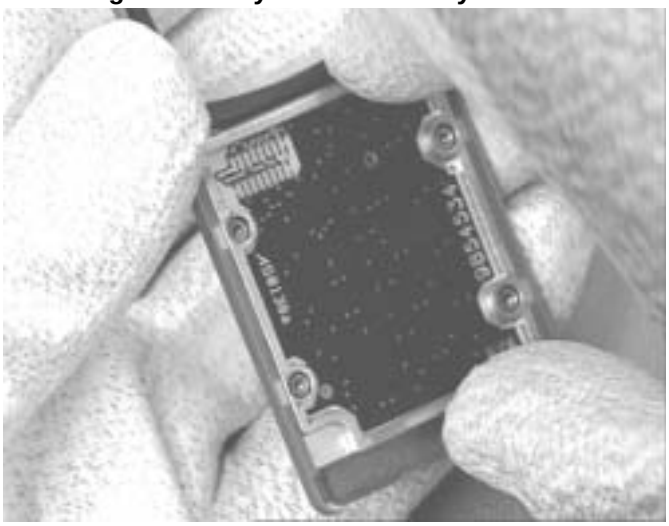
Remove the keyboard assembly from the A-cover.

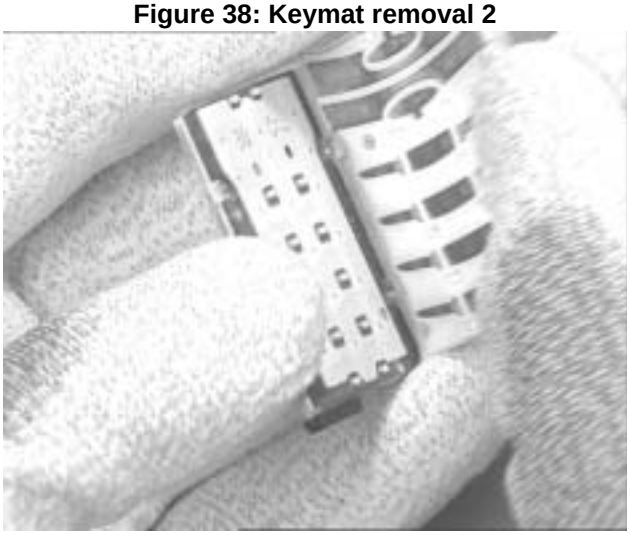
Figure 36: Keyboard assembly removal



Remove the keymat.

Figure 37: Keymat removal 1

Figure 38: Keymat removal 2



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Remove the User Interface board from the frame.

Figure 39: UI board removal

Remove the speaker from the A-cover.

Figure 40: Speaker removal

Remove the buzzer from the A-cover.

Figure 41: Buzzer removal

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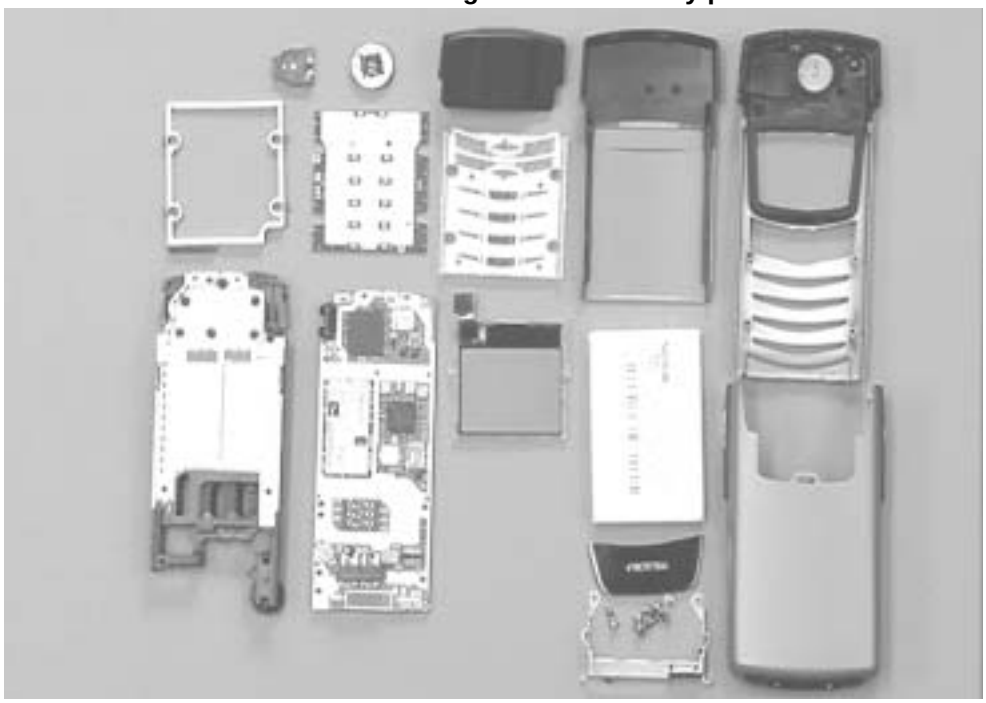
Assembly parts of NHM-4 phone:

Figure 42: Assembly parts



Reassembly

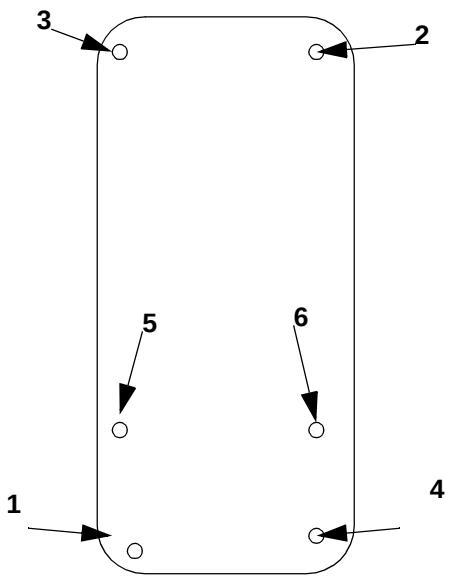
Reassembly of the phone is carried out in reverse order to disassembly.

The screws cannot be re-used.

The screwdriver tip type is Torx T6+ and the torque force is 17ncm

The order of tightening the screws is described below:

Figure 43: Order of tightening screws



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Bluetooth module removal and reassembly

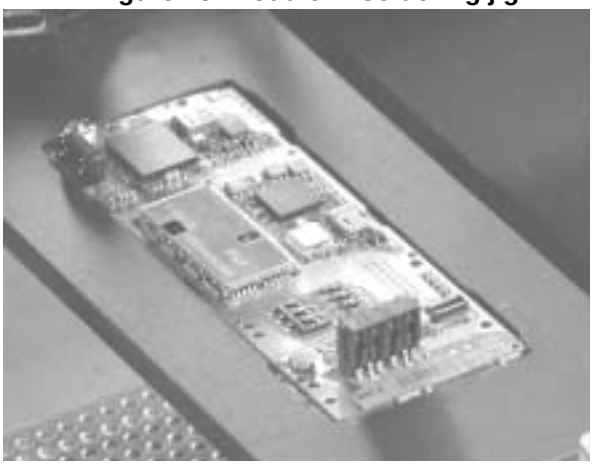
Take anti-ESD precautions!

Figure 44: anti-ESD wrist strap donned

Preparing to remove the defective BT module from the circuit board.

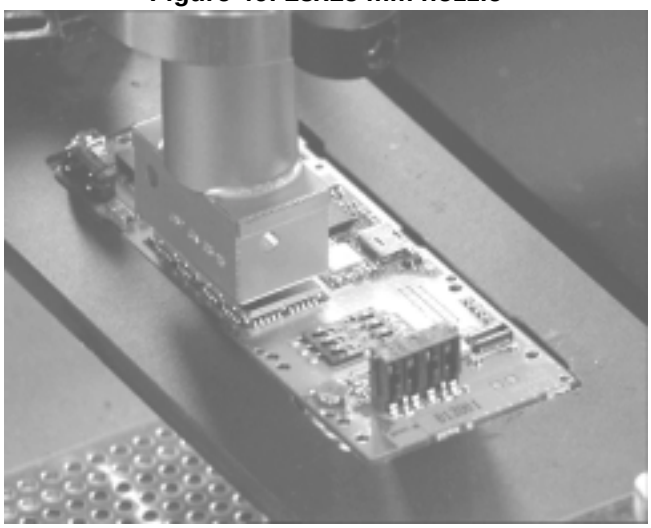
Use a rework station for CPS components.

Figure 45: Module in soldering jig



Desoldering nozzle size is 28 x 15 mm.

Figure 46: 28x15 mm nozzle



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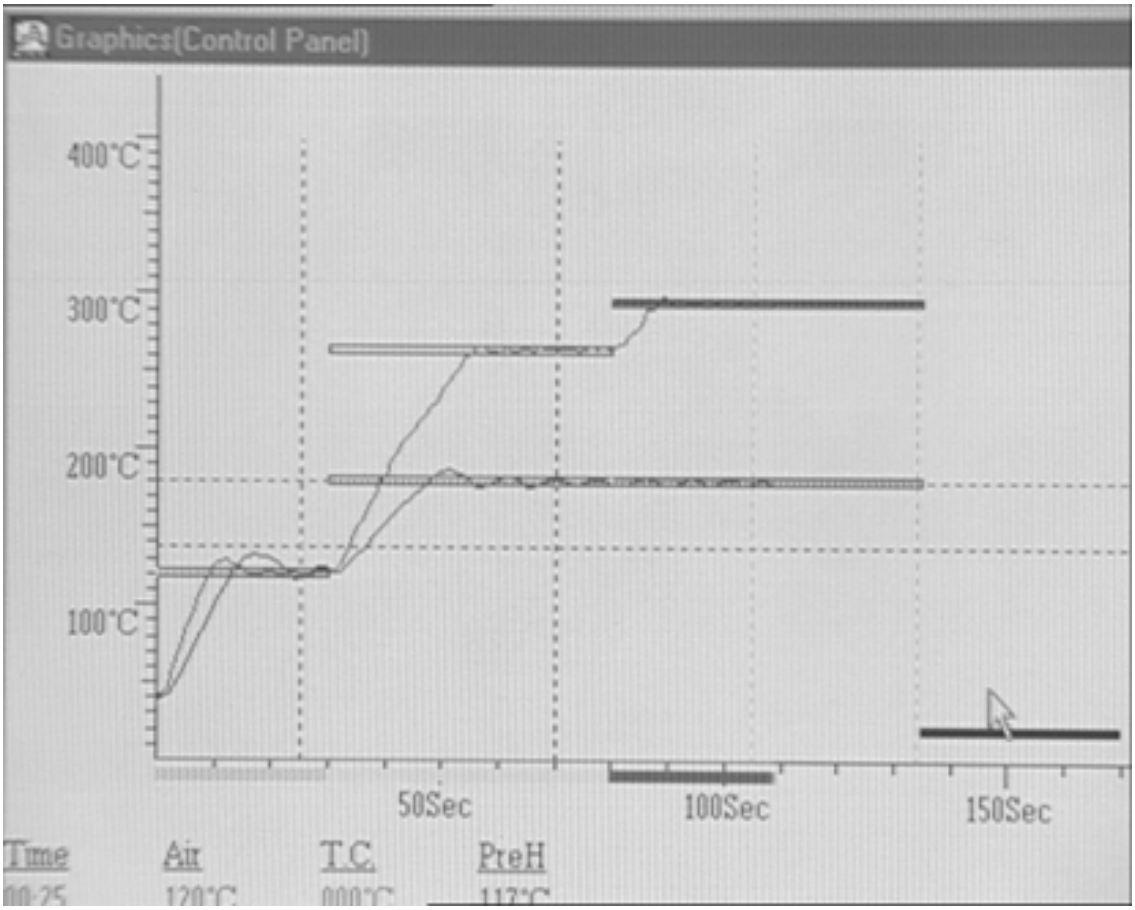
The desoldering profile is a BT. When the peak step ends, lift the heating head up.

Figure 47: Desoldering profile



Pick up the component with tweezers.

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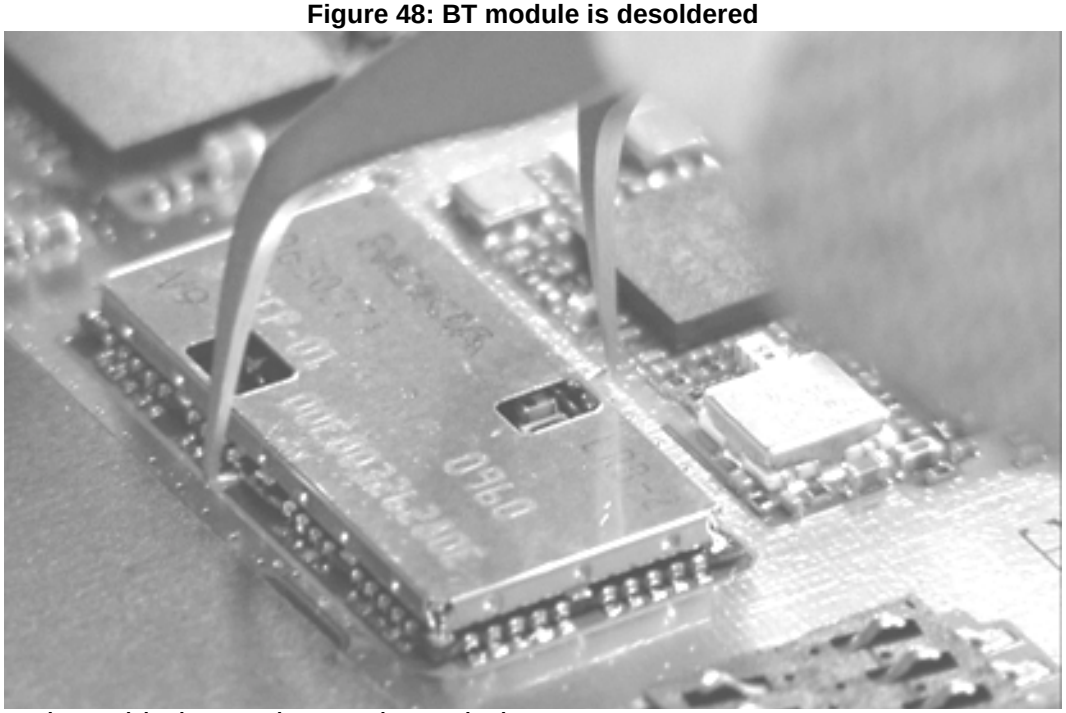
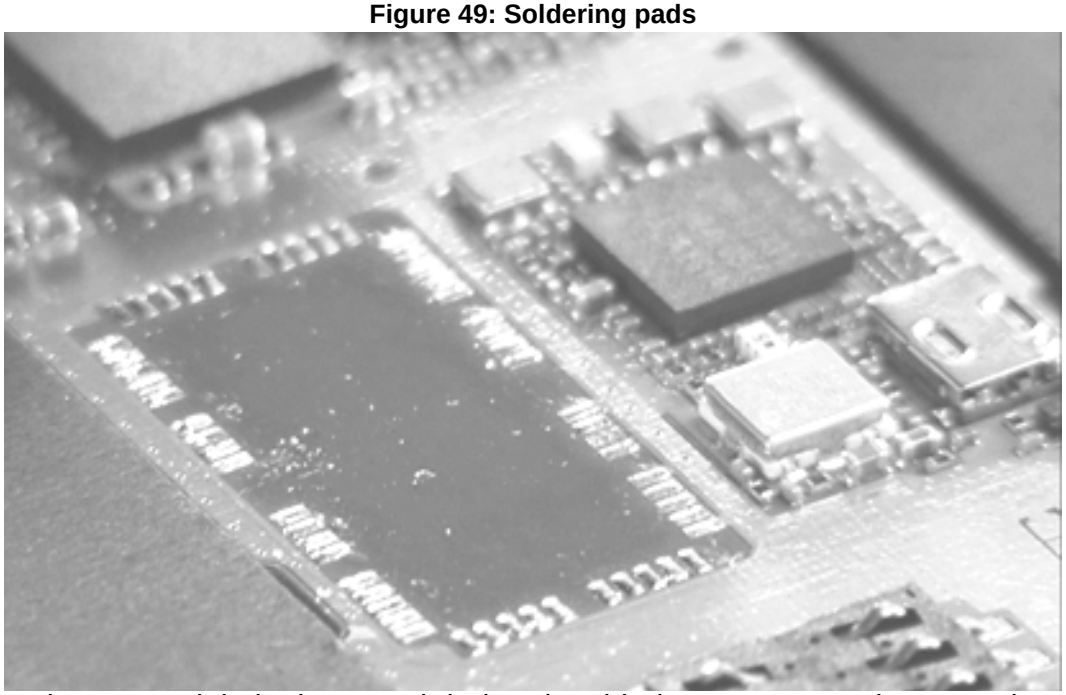
Figure 48: BT module is desoldered



The soldering pads are shown below.

Figure 49: Soldering pads



The BT module is destroyed during desoldering. It must not be reused or reworked!

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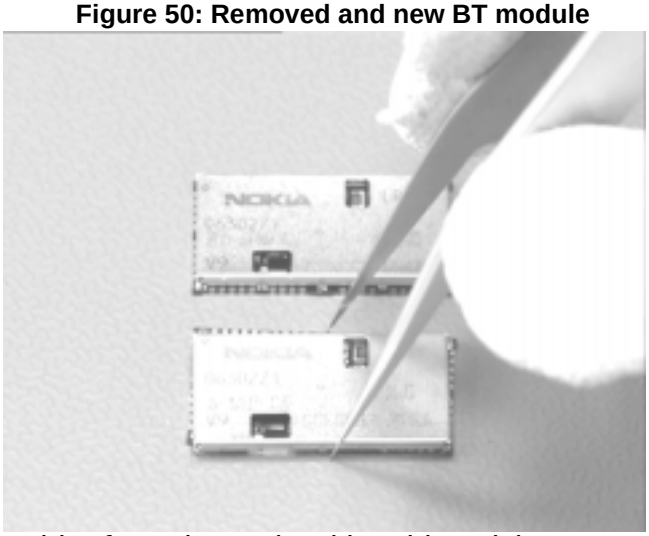
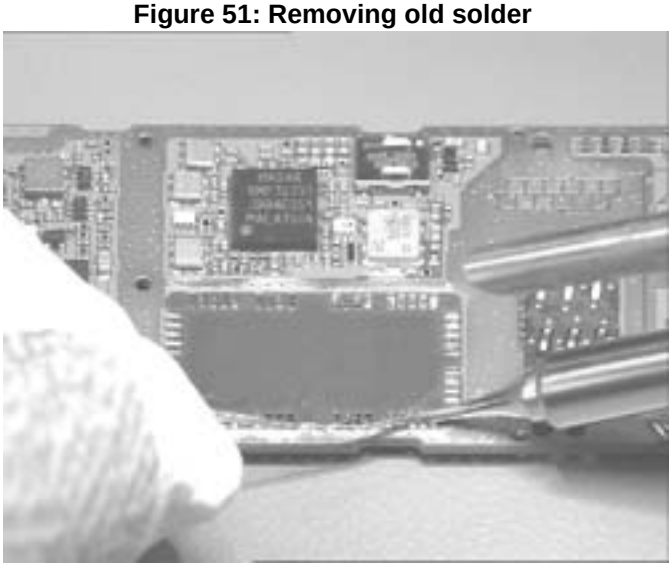
Figure 50: Removed and new BT module



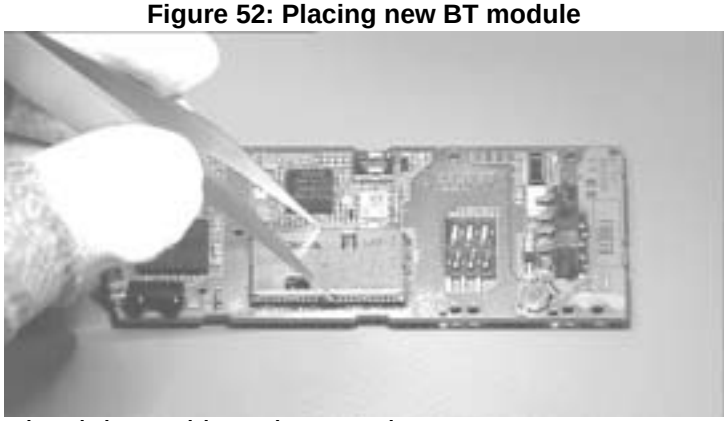
Remove old solder from the pads with solder wick.

Figure 51: Removing old solder



Place a new BT module on the circuit board

Figure 52: Placing new BT module



Make sure that it is positioned correctly.

Apply flux.

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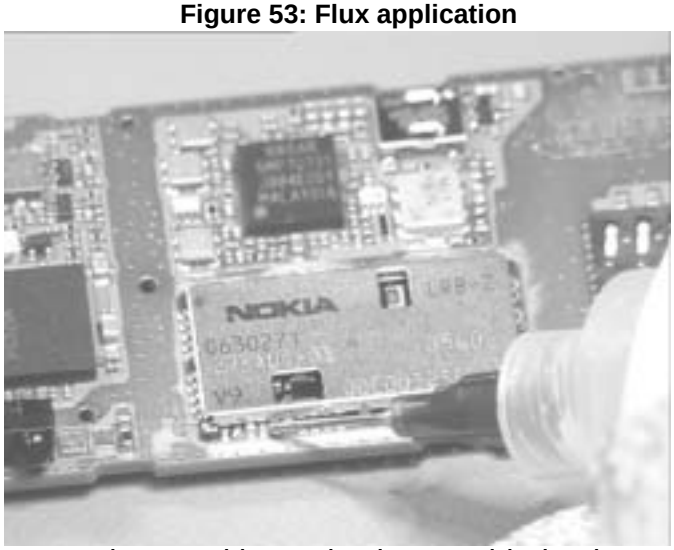
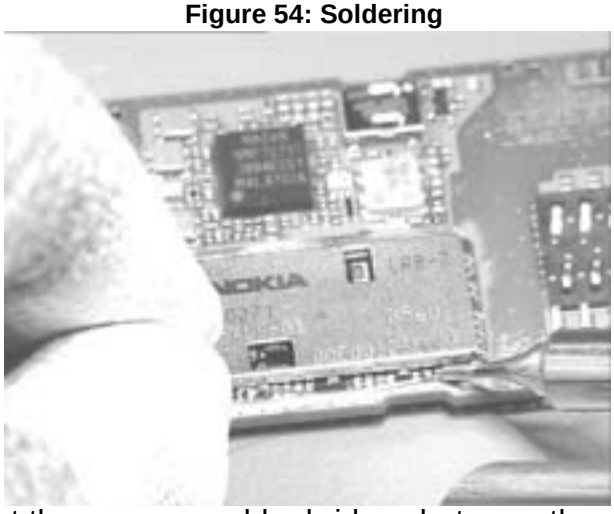
Figure 53: Flux application



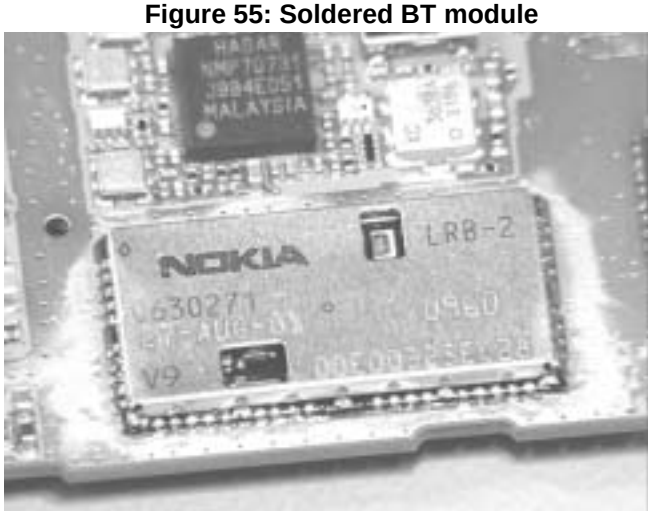
Solder the connections pad by pad using a soldering iron with a manywave tip or equal, but NOT with a rework station.

Figure 54: Soldering



Make sure that there are no solder bridges between the pads and the module shield!

Figure 55: Soldered BT module



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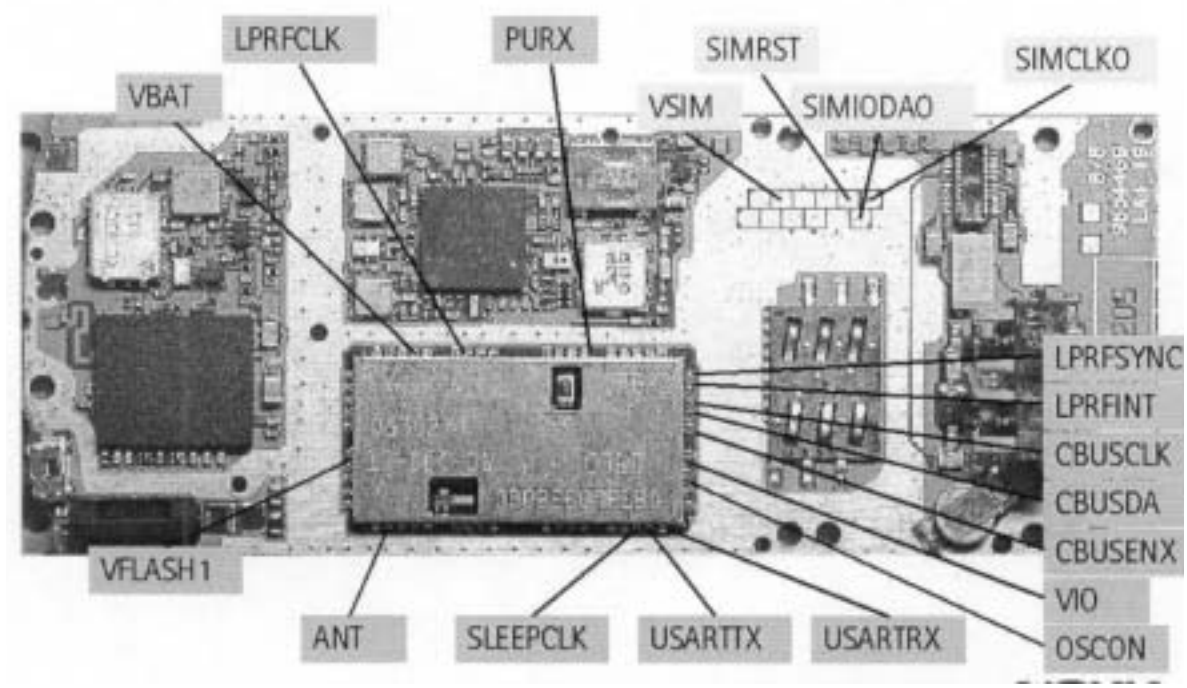
Transceiver Troubleshooting

Test points

SIM test points

Figure 1: SIM Test Points



Signal name	Function	Test point	Signal characteristics	Notes
VSIM	Power supply to SIM card	J389	1.8V or 3.0V	Level dependent on SIM card type
SIMRST	SIM reset	J387	Digital signal	Level dependent on SIM card type
SIMIO DAO	SIM data	J386	Digital signal	Level dependent on SIM card type
SIMCLKO	SIM clock	J388	3.25 MHz Digital clock signal	Level dependent on SIM card type

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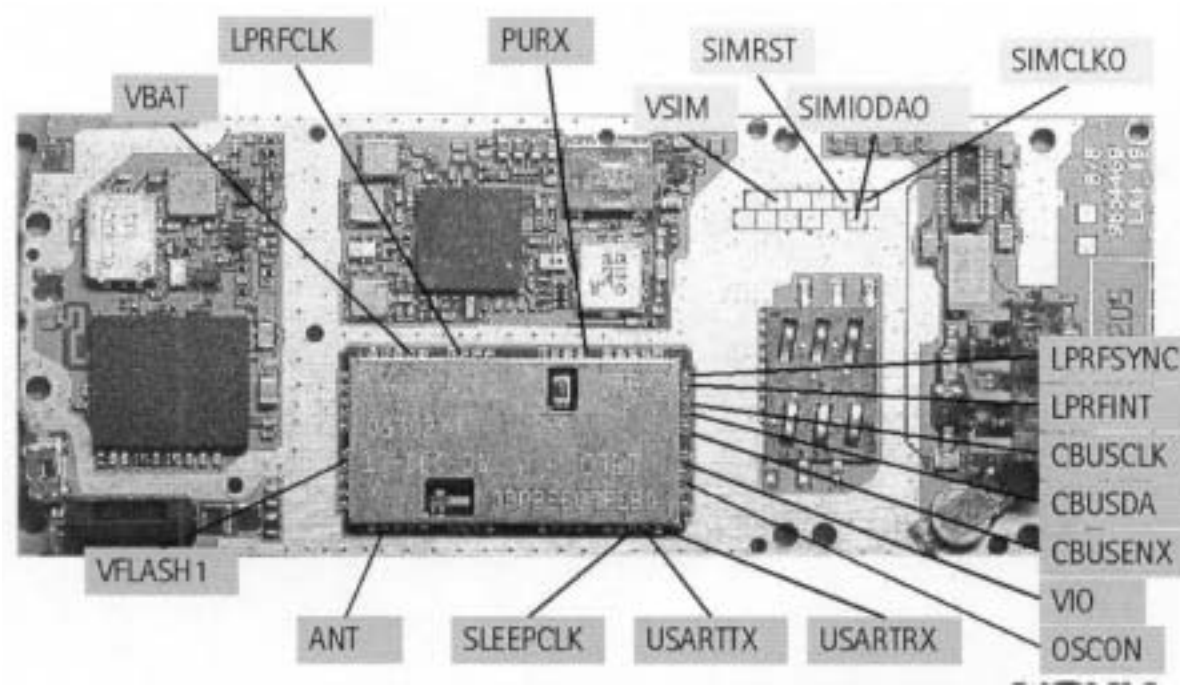
Bluetooth test points

Figure 2: Bluetooth test points



Signal name	Function	Test point	Signal characteristics	Notes
VSIM	Power up reset	V130/44	1.8 - 0V, digital signal	
LPRFCLK	System clock for BT module	V130/50	26MHz analog signal	Requirement >0.2Vpp
VBAT	Battery voltage for BT module	V130/52, 53, 54	3.6 V	2.95 - 4.23 V
VFLASH1	Power supply for LCD, IR, BT and Flash memory	V130/6	2.8V	
SLEEPCLK	Sleep clock	V130/26	1.8 - 0V, 32kHz digital clock signal	
USARTTX	Serial data output	V130/27	1.8 - 0V, digital signal	For audio data transmission
USARTRX	Serial data input	V130/28	1.8 - 0V, digital signal	For audio data transmission
OSCON	V130 sleep mode control	V130/31	1.8 - 0V, digital signal	
VIO	Power supply for LCD, IR, BT and Flash memory	V130/32	1.8 V	
CBUSCLK	Serial clock	V130/36	1.8 - 0V, 1MHz digital clock signal	Controlled by MCU
CBUSDA	Serial data in/output	V130/35	1.8 - 0V, digital signal	Controlled by MCU
CBUSENX	CBUS selection and enable	V130/34	1.8 - 0V, digital signal	Controlled by MCU

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LPRFSYNC	Exchanges timing info between BT and UPP	V130/38	1.8 - 0V, digital signal	Needed in sleep mode
LPRFINT	Interrupt request for UPP	V130/37	1.8 - 0V, digital signal	Initialling data transfer in CBUS

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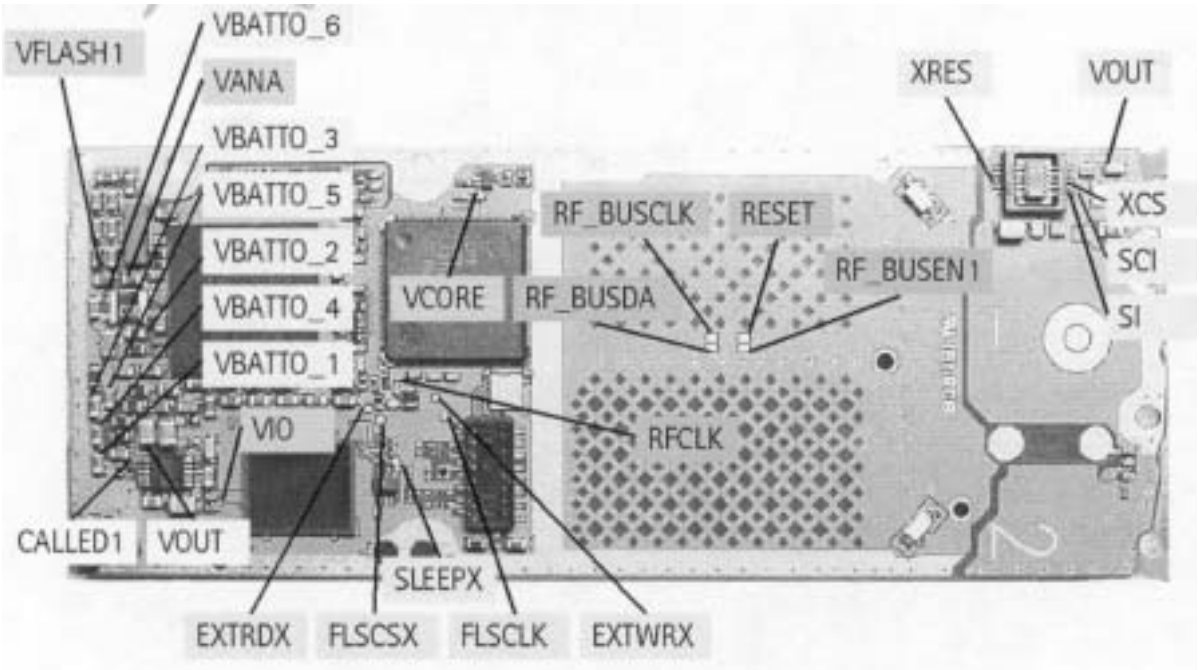
Power test points

Figure 3: Power test points



Signal name	Function	Test point	Signal characteristics	Notes
VFLASH1	Power supply for LCD, IR, BT, FLASH mem.	C205	2.8 V	
VANA	Power supply for UEM (AD, RF, Audio Codecs)	C206	2.8 V	
VCORE	Power supply for UPP	C400	1.0 - 1.8 V programmable	1.8 V, initial value=1.5V
CALLED1	DC/DC converter ctrl	R325	~ VBAT	
VOUT	Power supply for key board and display LEDs	C320	4.1 V	
VBATTO_1	Power supply for VANA, VR3, VR4, VR7 regulators	C260	=VBAT	
VBATTO_2	Power supply for VFLASH1, VFLASH2, VSIM regulators	C261	=VBAT	
VBATTO_3	Power supply for VCORE regulator	C262	=VBAT	
VBATTO_4	Power supply for VR1A, VR1B, VR2 regulators	C264	=VBAT	
VBATTO_5	Power supply for VR5, VR6 regulators	C263	=VBAT	
VBATTO_6	Power supply for regulators	C265	=VBAT	

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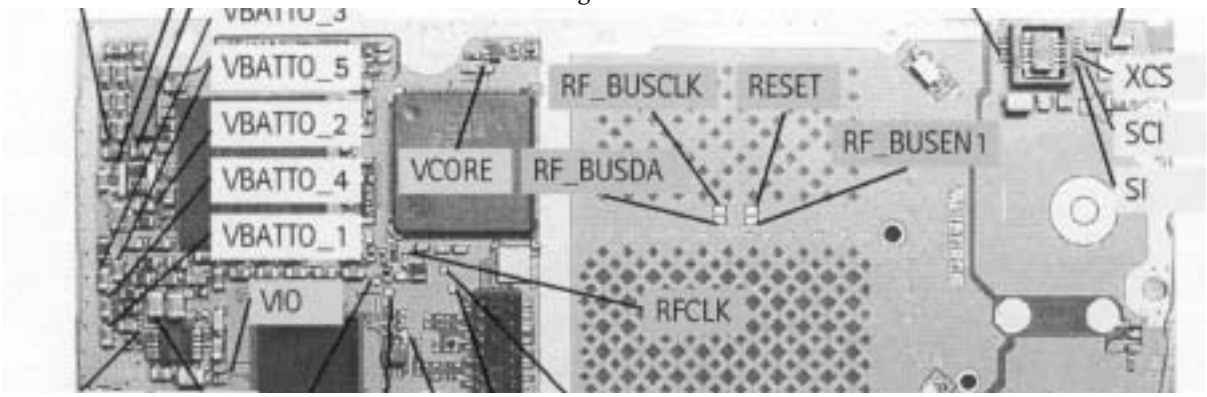
LCD, RF and Flash test points

Figure 4:



Signal name	Function	Test point	Signal characteristics	Notes
EXTRDX	Flash memory read enable	J417	1.8 - 0V, digital signal	
FLSCSX	Flash memory chip select	J420	1.8 - 0V, digital signal	
FLSCLK	Flash memory clock in burst mode	J419	0 - 1.8 V, digital ~35MHz clock signal	Burst mode only when read
EXTWRX	Flash memory write enable	J416	1.8 - 0V, digital signal	

Signal name	Function	Test point	Signal characteristics	Notes
XRES	LCD reset	X300/4	1.8 - 0V, digital signal	
SI	LCD serial data input	X300/6	1.8 - 0V, digital signal	
SCI	LCD serial clock input	X300/7	1.8 - 0V, 3.25 MHz digital clock signal	
XCS	LCD chip select	X300/8	1.8 - 0V, digital signal	
VOUT	Booster output from LCD	C330	8.1 V	requirement max. 9VDC

Signal name	Function	Test point	Signal characteristics	Notes
SLEEPX	Sleep mode ctrl for phone	J403	1.8 - 0V, digital signal	

Signal name	Function	Test point	Signal characteristics	Notes
RESET	Hagar reset	J1	0 - 1.8V, digital signal	
RF_BUSDA	Hagar control serial data	J2	0 - 1.8V, digital signal	

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RF_BUSCLK	Hagar control serial clock	J3	0 - 1.8V, 13 MHz digital clock signal	
RF_BUSEN1	Hagar chip select and latch enable	J4	1.8 - 0V, digital signal	
RFCLK	System clock for base band	C420	13V analog signal	Requirement >0.3Vpp

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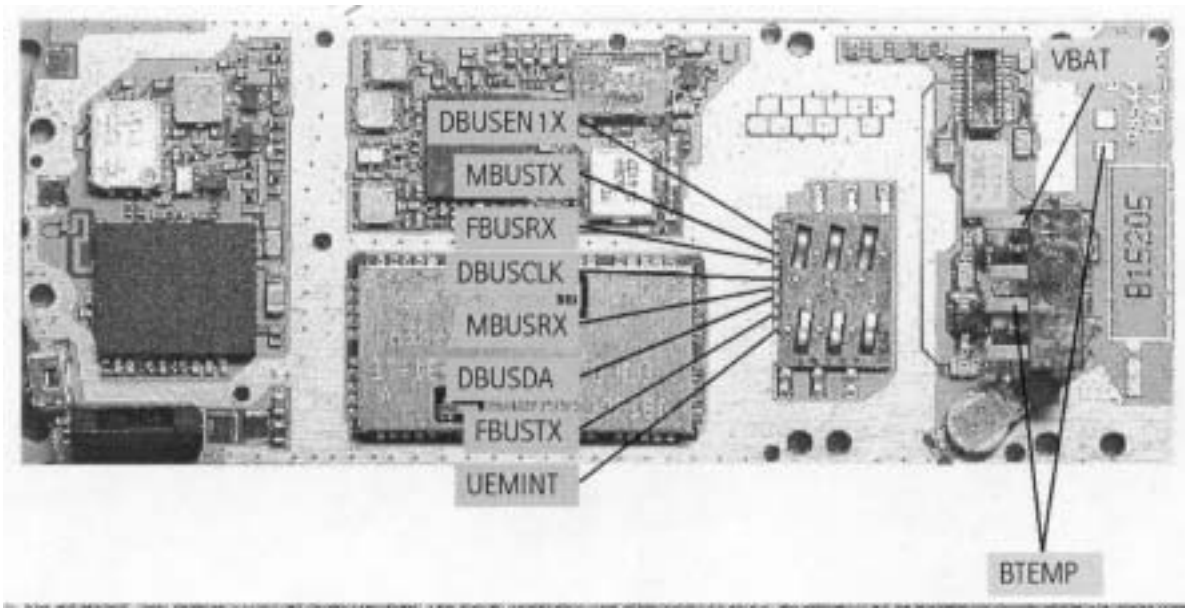
Miscellaneous test points

Figure 5:



Signal name	Function	Test point	Signal characteristics	Notes
UEMINT	Interrupt request for UPP	J405	0 - 1.8V, digital signal	
DBUSCLK	DBUS clock	J413	0 - 1.8V, 13 MHz digital clock signal	Controlled by DSP
DBUSEN1X	DBUS selection and enable	J415	1.8 - 0V, digital signal	Controlled by DSP
MBUSRX	MBUS from UEM and UPP	J410	1.8 - 0V, digital signal	
MBUSTX	MBUS from UPP and UEM	J409	1.8 - 0V, digital signal	
FBUSRX	FBUS from UEM to UPP	J412	0 - 1.8V, digital signal	
FBUSTX	FBUS from UPP to UEM	J411	1.8 - 0V, digital signal	
DBUSDA	DBUS data in/output	J414	0 - 1.8V, digital signal	Controlled by DSP

Signal name	Function	Test point	Signal characteristics	Notes
BTEMP	Battery temperature, test mode switch	Batt.conn. and J102		
VBAT	Battery voltage for UEM, PA, DC/DC converter, IR, BT, Vibra and Buzzer	Battery connector	3.6 V	2.95 - 4.23V

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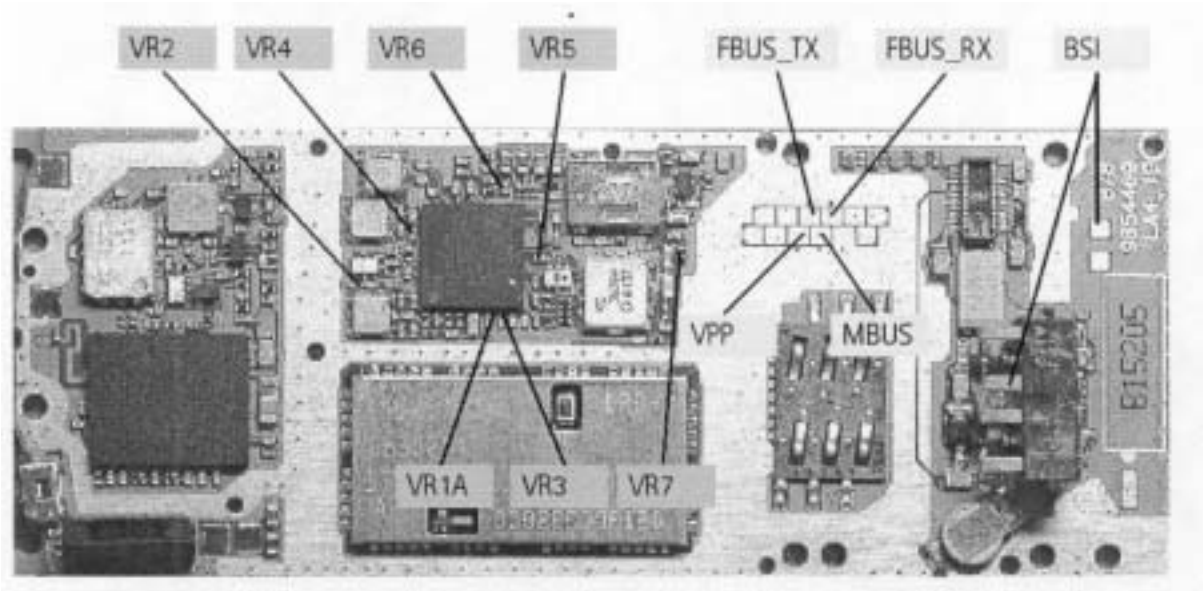
Flash programming and RF power supply test points

Figure 6:



Signal name	Function	Test point	Signal characteristics	Notes
FBUS_TX	Flash programming data and phone control	PRODTP2	2.8 - 0V, digital signal	From phone to prommer or PC
FBUS_RX	Flash programming data and phone control	PRODTP3	2.8 - 0V, digital signal	From prommer or PC to phone
MBUS	Flash programming clock and phone control	PRODTP7	2.8 - 0V, digital signal, clocks up to 6,5 MHz	Bidirectional phone control
BSI	Flash progr. startup signal, battery size indicator, local mode switch, SIM card detection	Batt conn and J101	2.8 - 0V, analog AD converter and digital signal	2.8V pulse when flashing starts, appx. 1.0V in normal mode, 0V in local mode
VPP	Flash programming voltage	PRODTP6	1.8V, up to 12V during flash programming	Internal progr.voltage 1,8V, external 12V

Signal name	Function	Test point	Signal characteristics	Notes
VR1A	Power supply for Hagar PLL charge pump	C600	4.75 V	
VR2	Power supply for TX modulator	C706	2.8 V	

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VR3	Power supply for VCTCXO	C602	2.8V	Controlled by SLEEPX signal
VR4	Power supply for Hagar	C601	2.8V	
VR5	Power supply for Hagar	C603	2.8V	
VR6	Power supply for Hagar	C605	2.8V	
VR7	Power supply for VCO	R652	2.8V	

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Troubleshooting steps

The following hints help to find the problem if the circuitry seems to be faulty. The instructions are divided into following sections:

1. Phone is totally dead.

2. Power does not stay on or the phone is jammed

3. Flash programming

4. Charging faults

5. Plug in SIM card is out of order (insert SIM card)

6. Audio faults

7. Display or keyboard is not working

8. Bluetooth faults

9. Grip switch faults

The first thing to do is to carry out a thorough visual check of the module. Ensure in particular that:

a) there are not any mechanical damages

b) solder joints are OK

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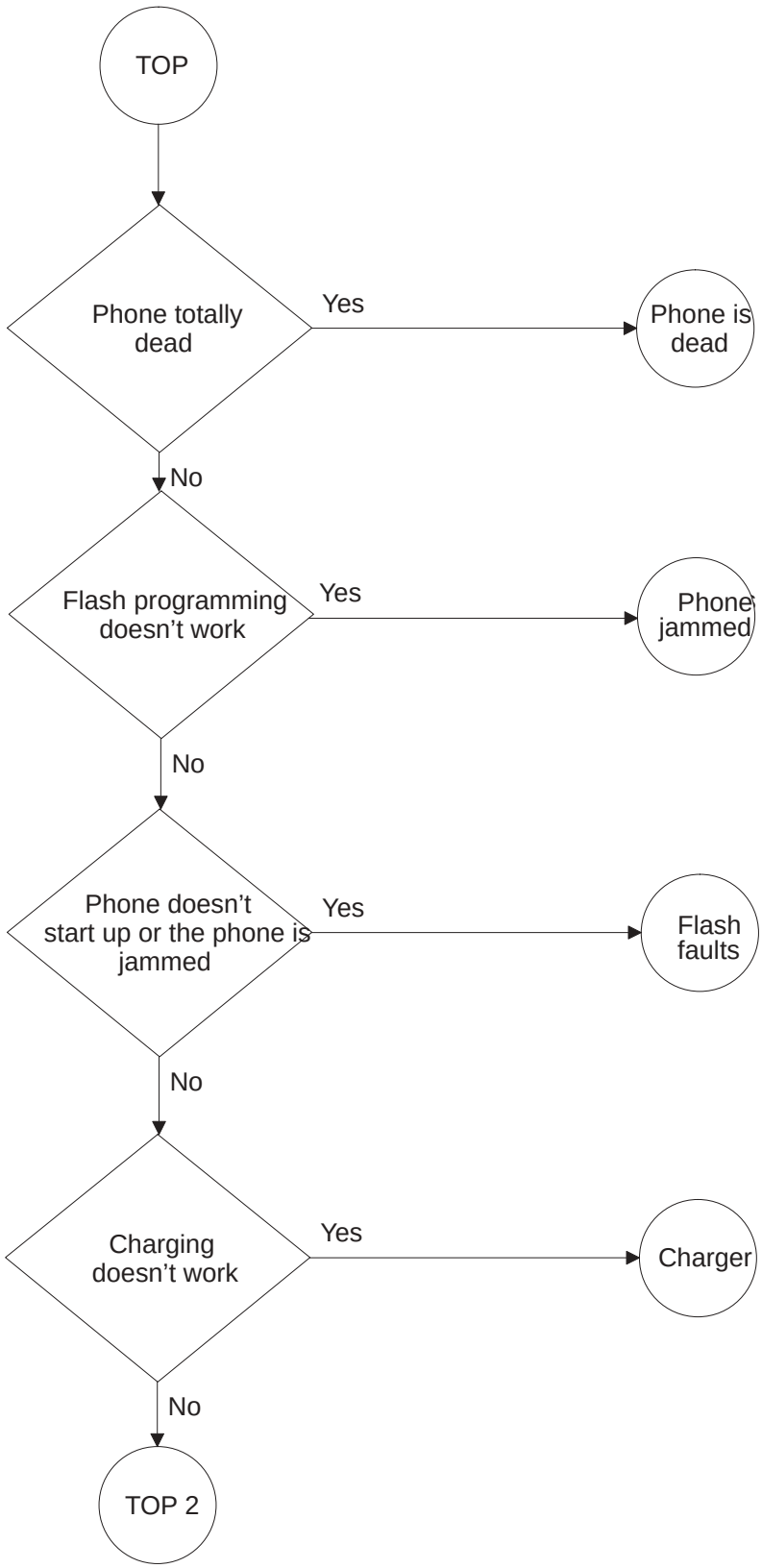
Main troubleshooting tree, 1

Figure 1:



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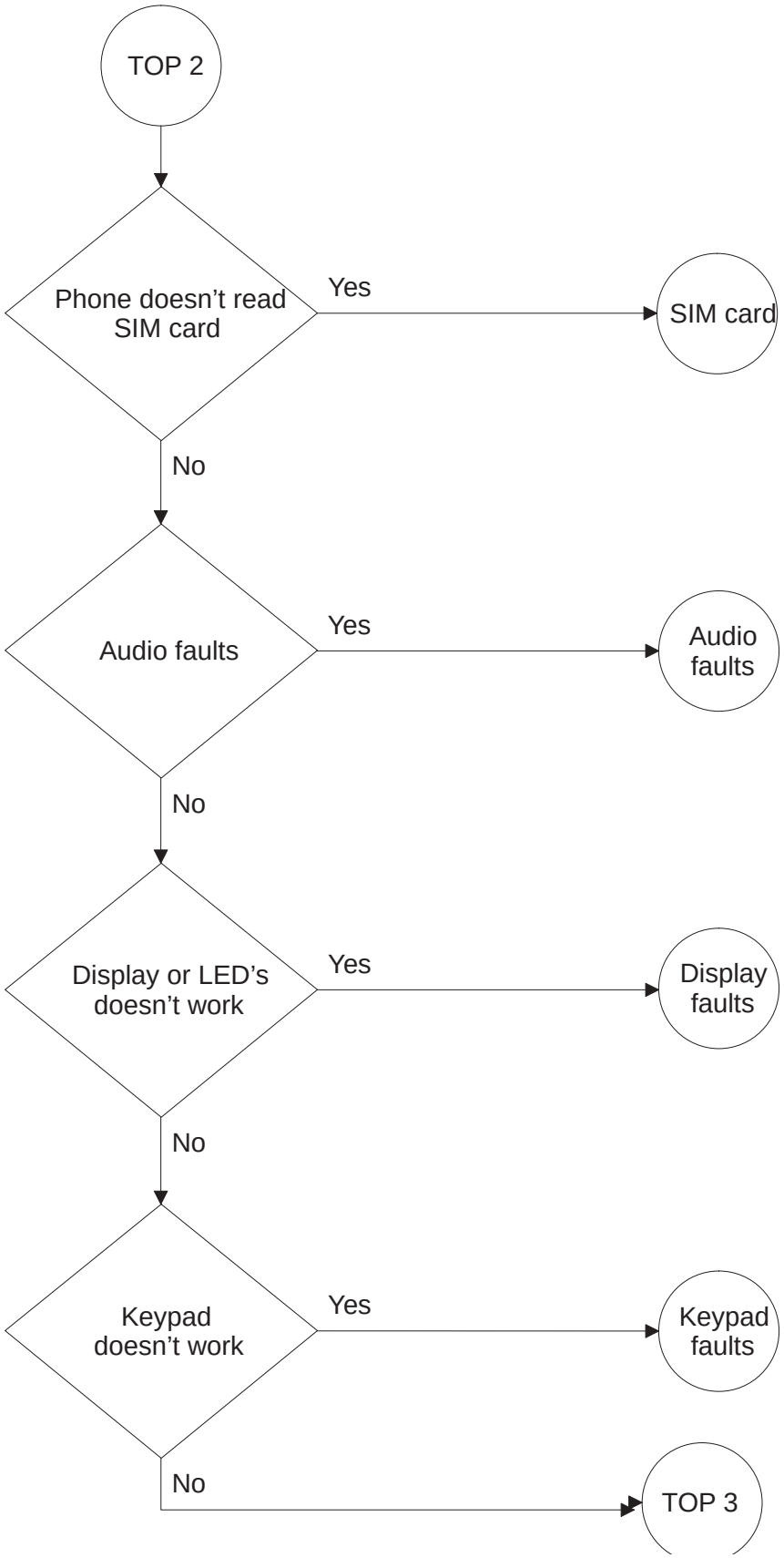
Main troubleshooting tree, 2

Figure 2:



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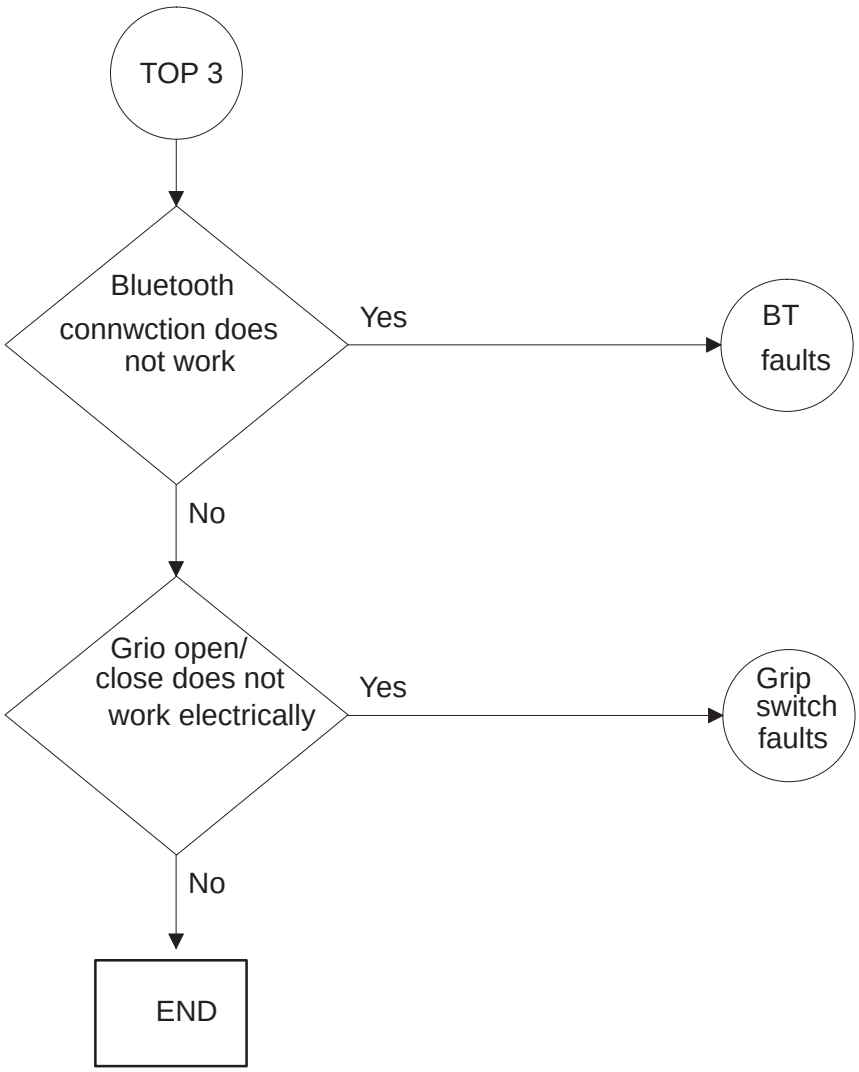
Main troubleshooting tree, 3

Figure 3:



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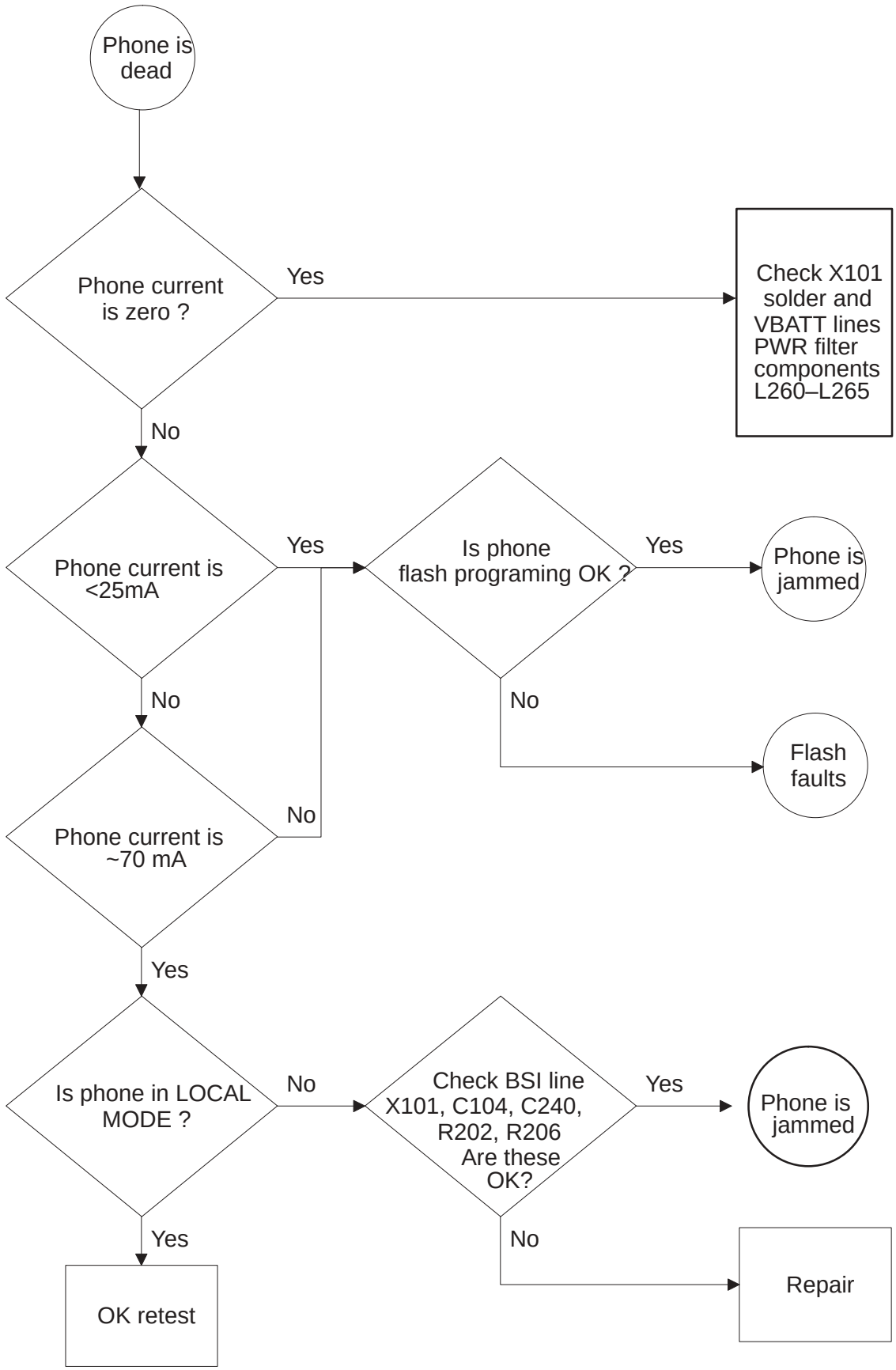
Phone is dead

Figure 4:



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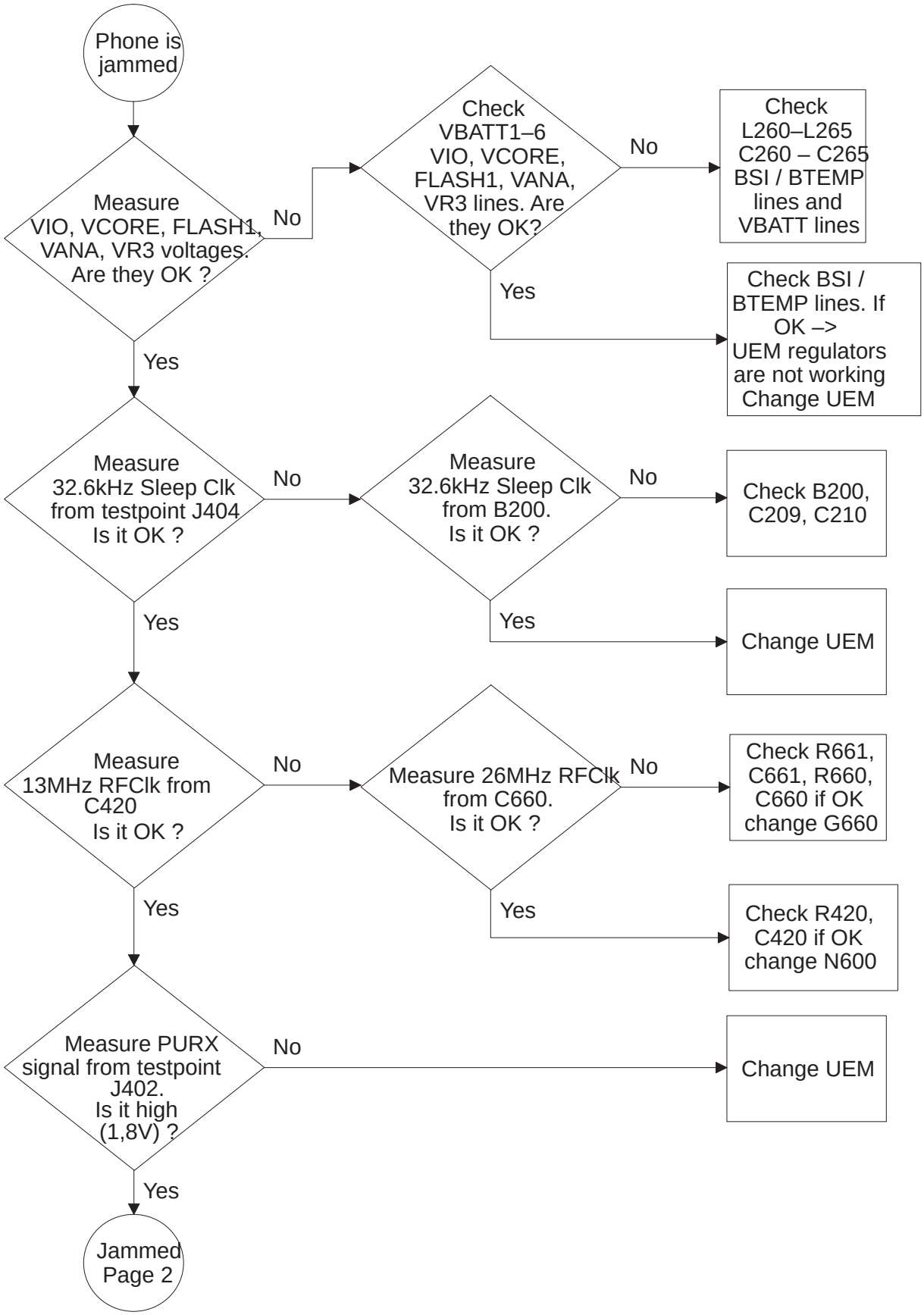
Phone is jammed, 1

Figure 5:


Phone is jammed
Measure VIO, VCORE, FLASH1, VANA, VR3 voltages. Are they OK ?
No
Check VBATT1–6 VIO, VCORE, FLASH1, VANA, VR3 lines. Are they OK?
No
Check L260–L265 C260 – C265 BSI / BTEMP lines and VBATT lines
Yes
Check BSI / BTEMP lines. If OK –> UEM regulators are not working Change UEM
Yes
Measure 32.6kHz Sleep Clk from testpoint J404 Is it OK ?
No
Measure 32.6kHz Sleep Clk from B200. Is it OK ?
No
Check B200, C209, C210
Yes
Yes
Change UEM
Measure 13MHz RFClk from C420 Is it OK ?
No
Measure 26MHz RFClk from C660. Is it OK ?
No
Check R661, C661, R660, C660 if OK change G660
Yes
Yes
Check R420, C420 if OK change N600
Measure PURX signal from testpoint J402. Is it high (1,8V) ?
No
Change UEM
Yes
Jammed Page 2

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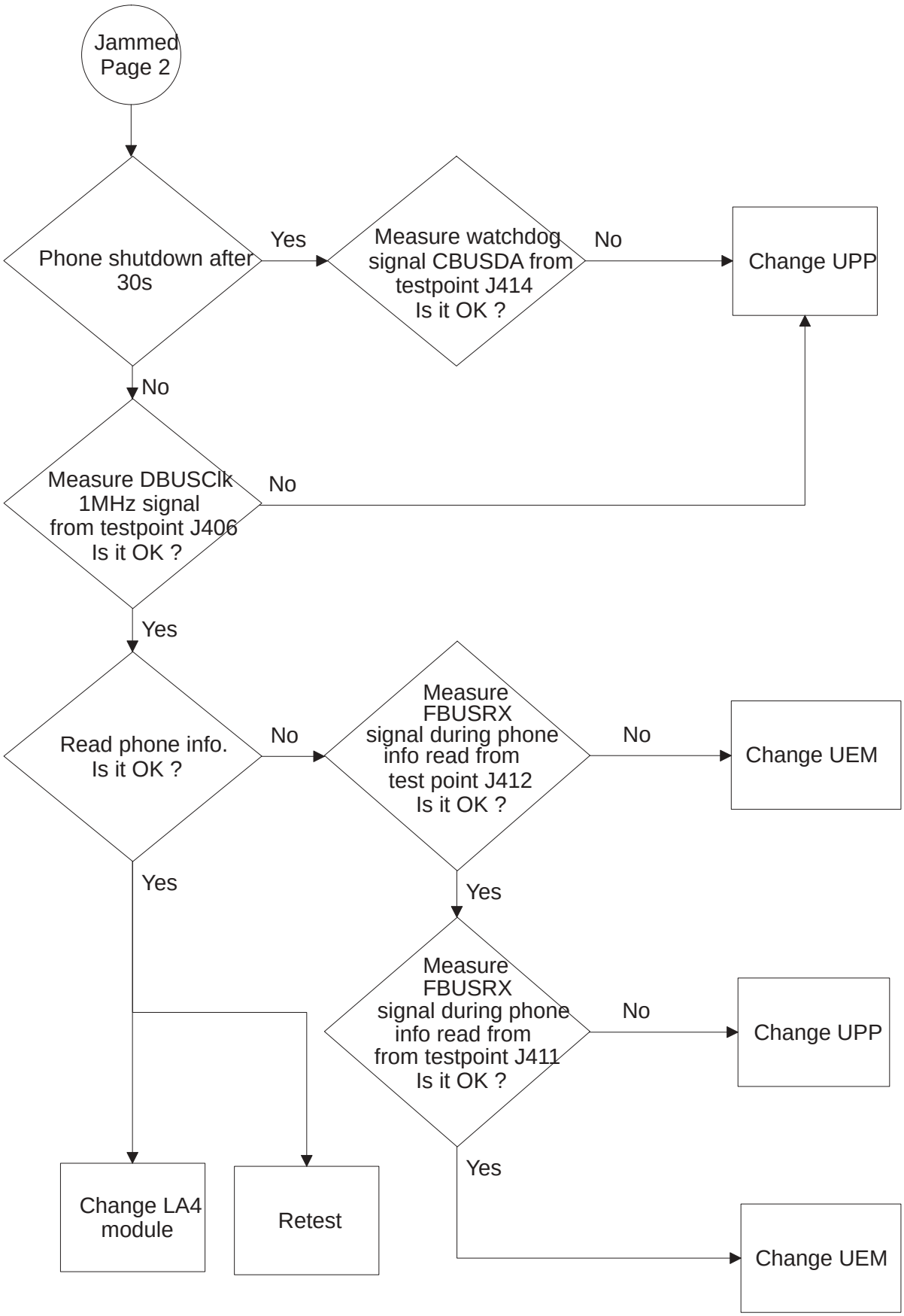
Phone is jammed, 2

Figure 6:



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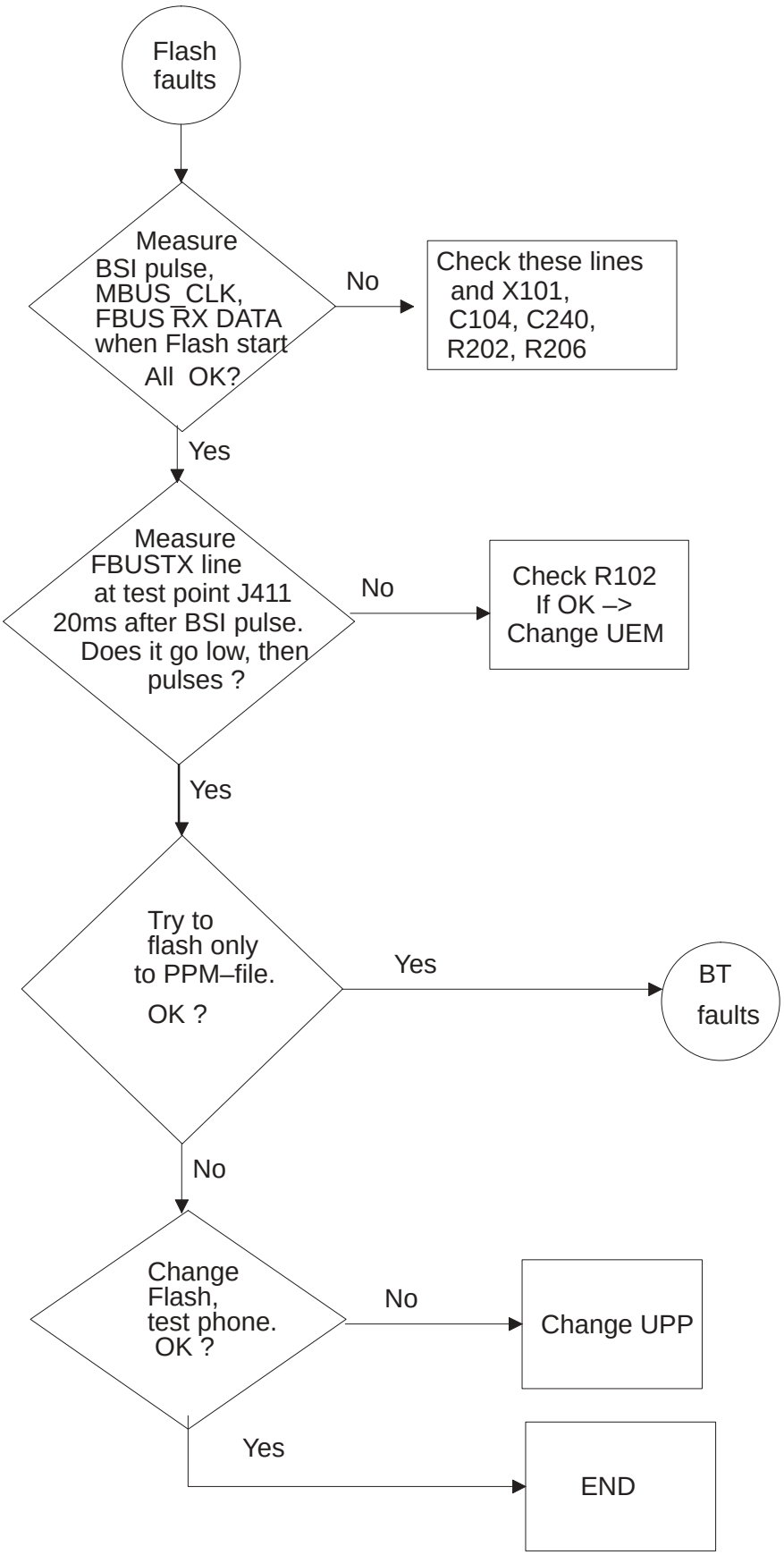
Flash programming doesn't work, 1

Figure 7:


Flash faults
Measure BSI pulse, MBUS_CLK, FBUS RX DATA when Flash start All OK?
No
Check these lines and X101, C104, C240, R202, R206
Yes
Measure FBUSTX line at test point J411 20ms after BSI pulse. Does it go low, then pulses ?
No
Check R102 If OK –> Change UEM
Yes
Try to flash only to PPM–file. OK ?
Yes
BT faults
No
Change Flash, test phone. OK ?
No
Change UPP
Yes
END

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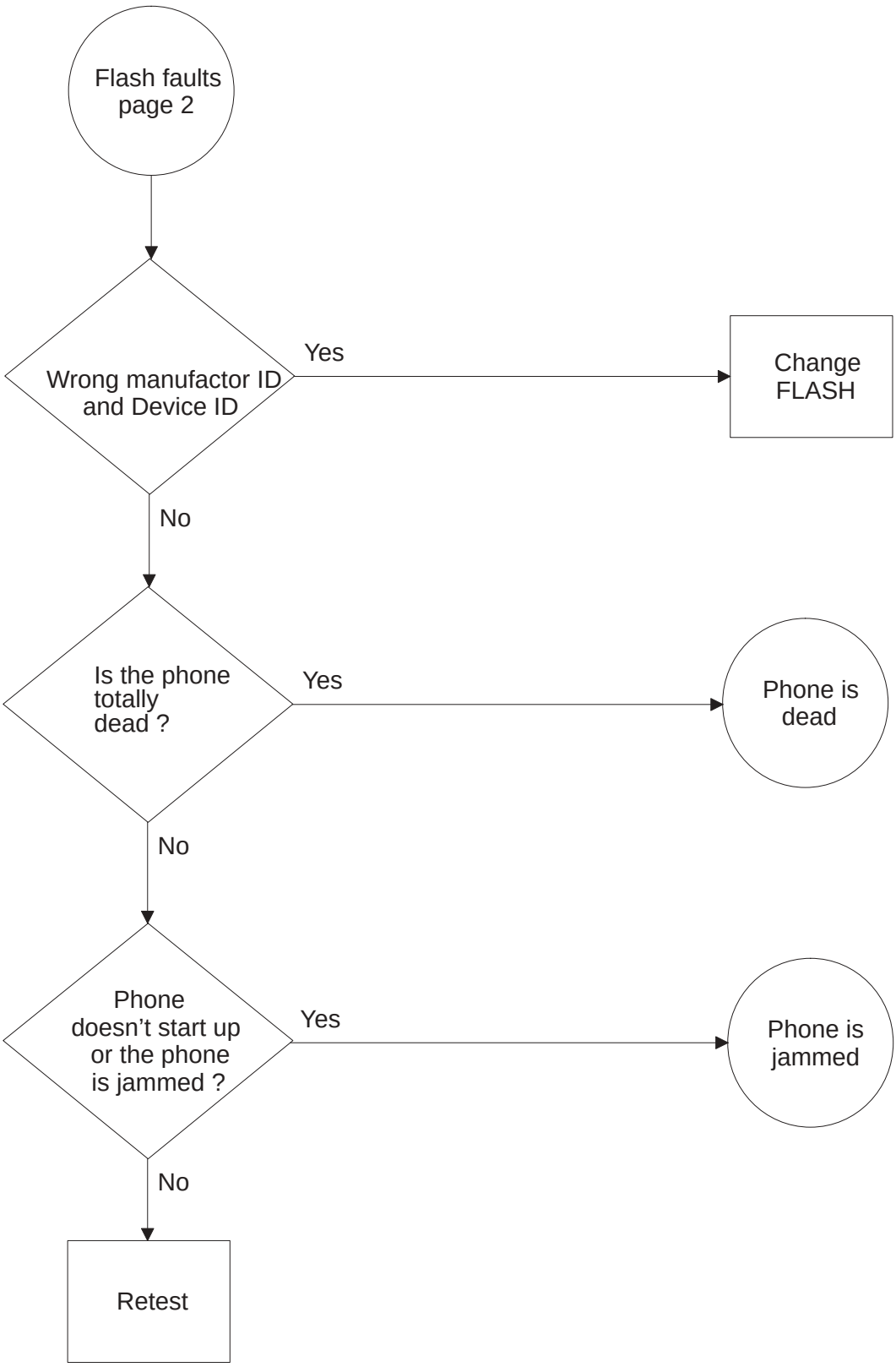
Flash programming doesn’t work, 2

Figure 8:



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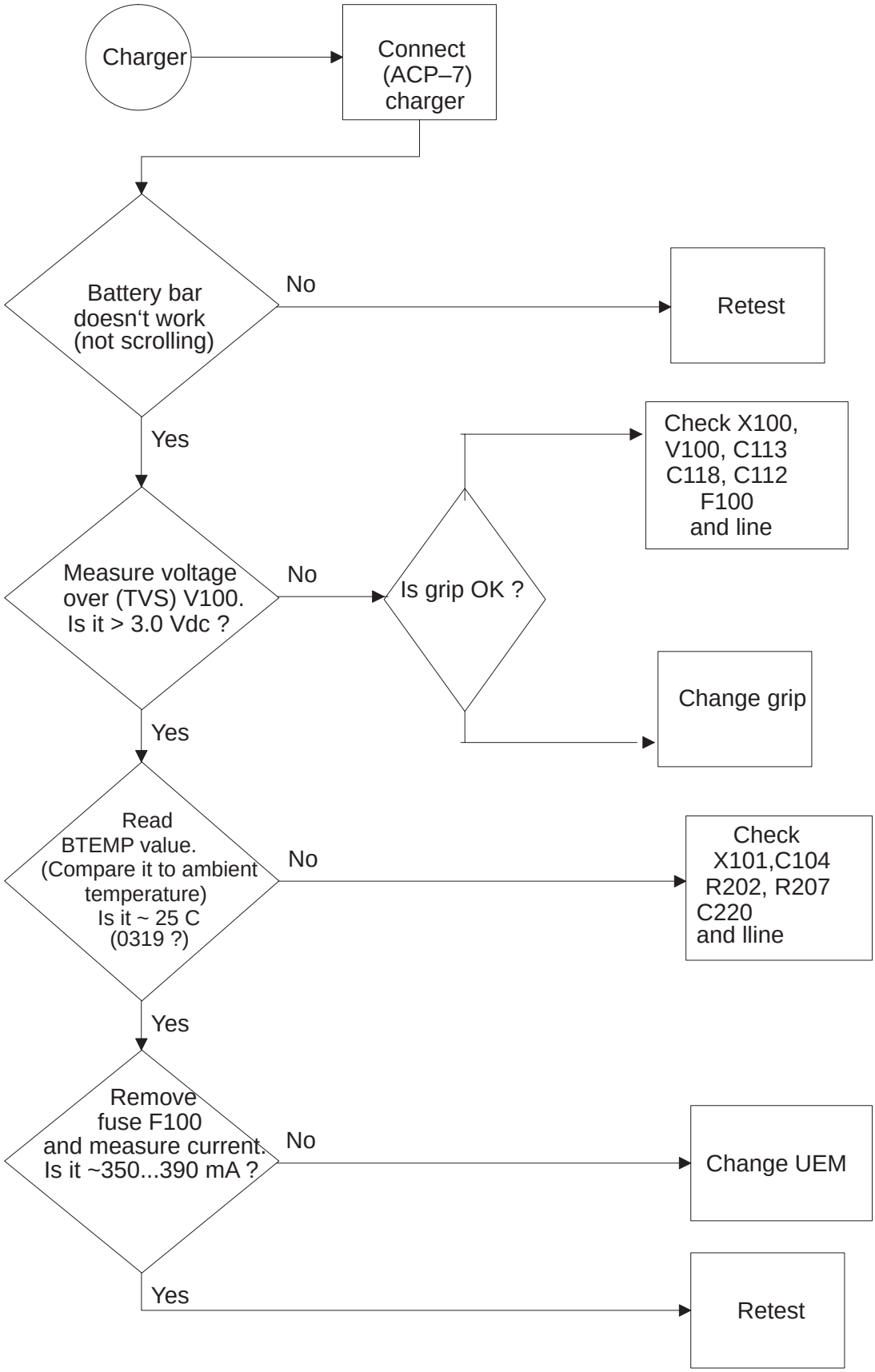
Charging troubleshooting

Figure 9:



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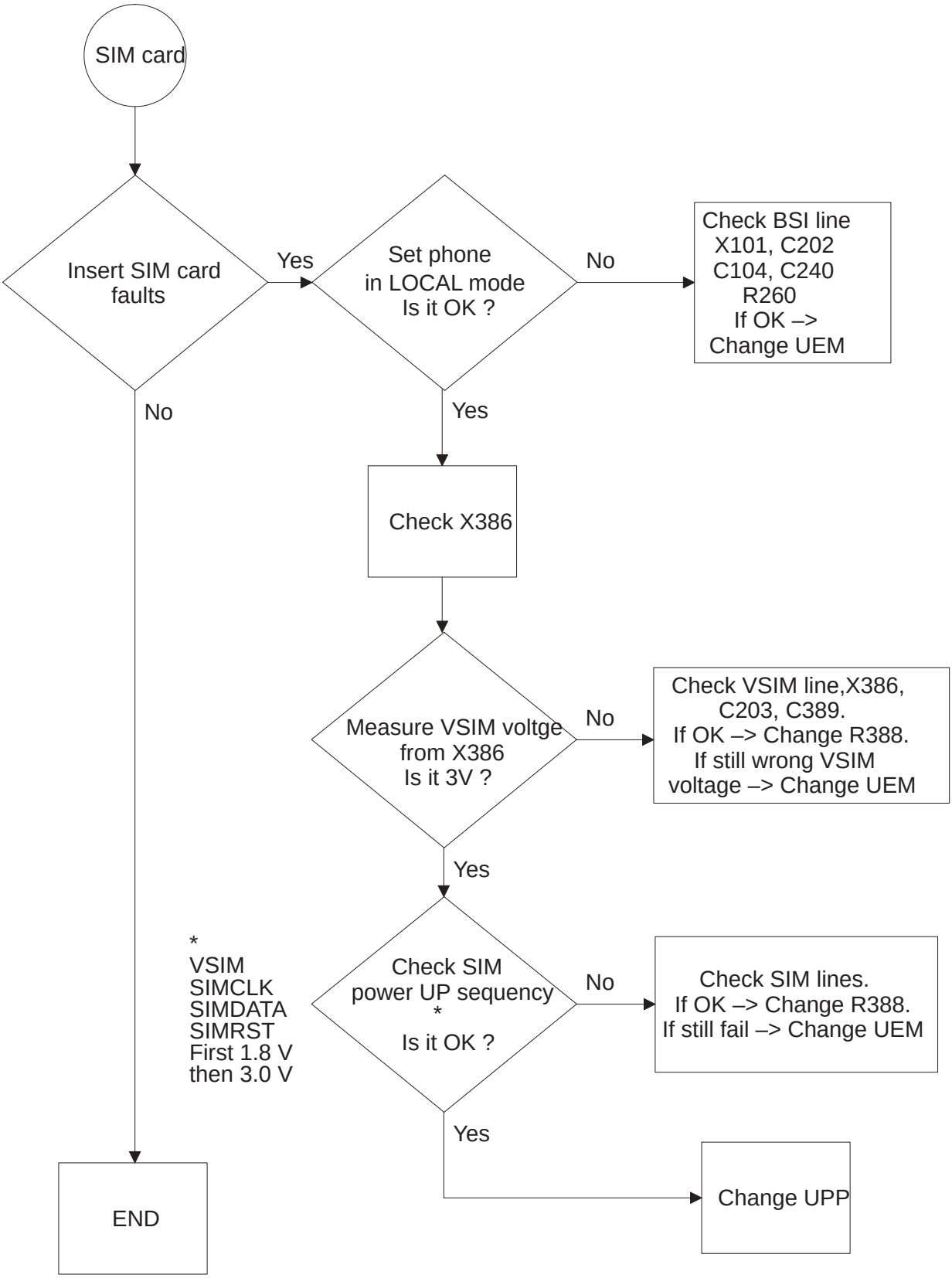
SIM card is out of order (insert SIM card)

Figure 10:


SIM card
Insert SIM card faults
Yes
Set phone in LOCAL mode Is it OK ?
No
Check BSI line X101, C202 C104, C240 R260 If OK –> Change UEM
No
Yes
Check X386
Measure VSIM voltge from X386 Is it 3V ?
No
Check VSIM line,X386, C203, C389. If OK –> Change R388. If still wrong VSIM voltage –> Change UEM
Yes
*
VSIM
SIMCLK
SIMDATA
SIMRST
First 1.8 V
then 3.0 V
Check SIM power UP sequency * Is it OK ?
No
Check SIM lines. If OK –> Change R388. If still fail –> Change UEM
Yes
END
Change UPP

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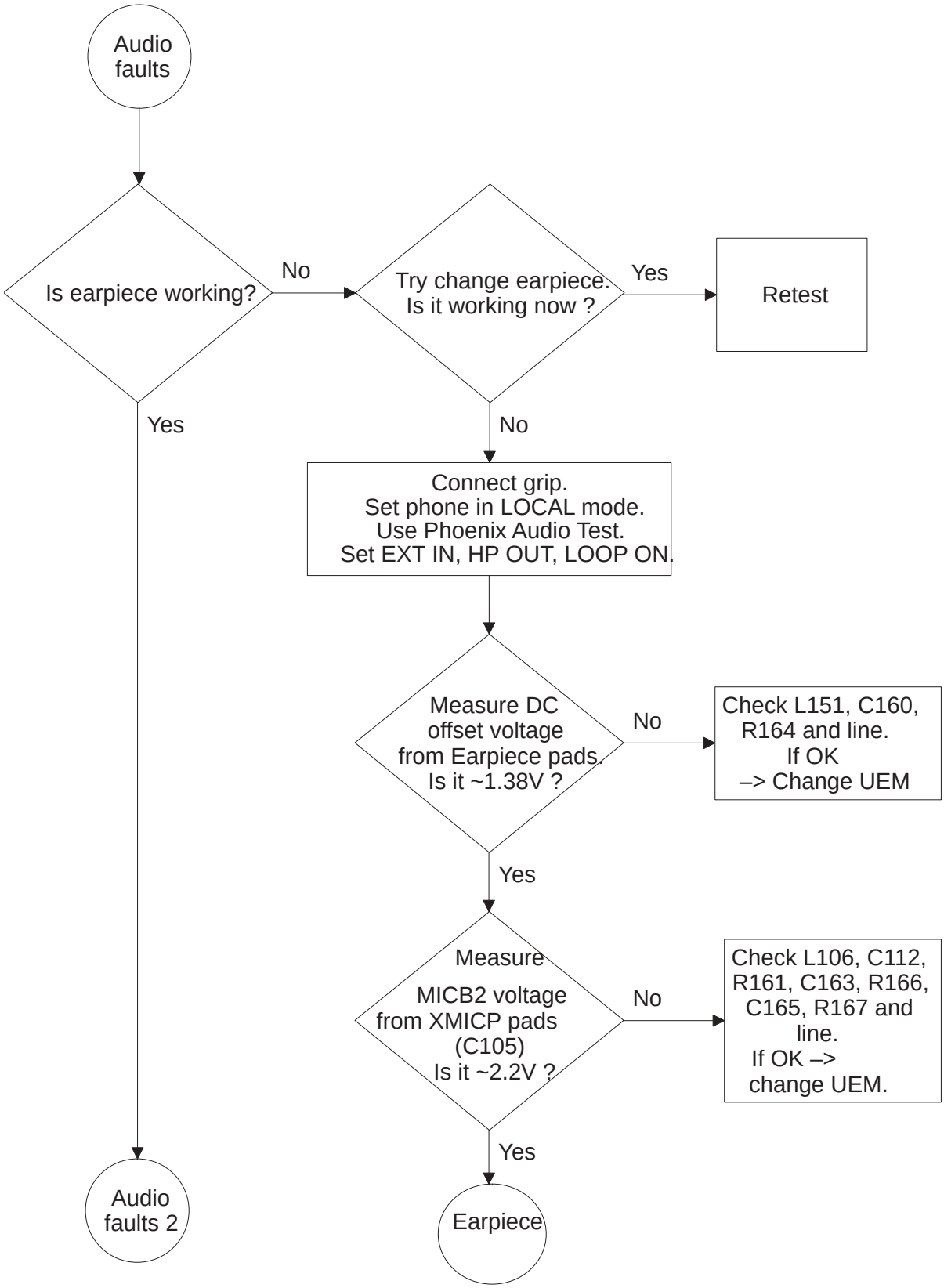
Audio troubleshooting 1

Figure 1:


Audio faults
Is earpiece working?
No
Try change earpiece. Is it working now ?
Yes
Retest
Yes
No
Connect grip. Set phone in LOCAL mode. Use Phoenix Audio Test. Set EXT IN, HP OUT, LOOP ON.
Measure DC offset voltage from Earpiece pads. Is it ~1.38V ?
No
Check L151, C160, R164 and line. If OK –> Change UEM
Yes
Measure MICB2 voltage from XMICP pads (C105) Is it ~2.2V ?
No
Check L106, C112, R161, C163, R166, C165, R167 and line. If OK –> change UEM.
Yes
Audio faults 2
Earpiece

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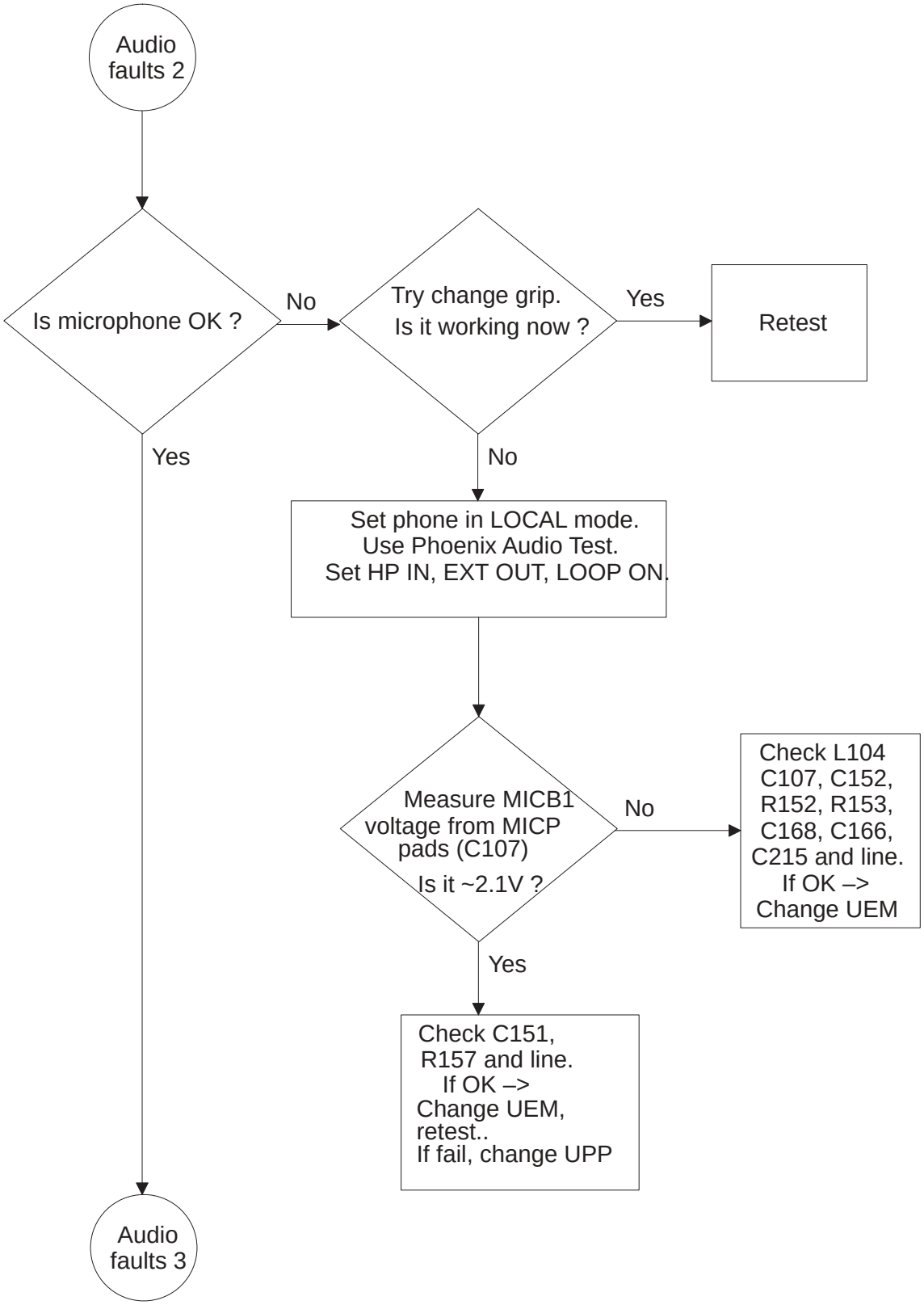
Audio troubleshooting 2

Figure 2:


Audio faults 2
Is microphone OK ?
No
Try change grip. Is it working now ?
Yes
Retest
Yes
No
Set phone in LOCAL mode. Use Phoenix Audio Test. Set HP IN, EXT OUT, LOOP ON.
Measure MICB1 voltage from MICP pads (C107) Is it ~2.1V ?
No
Check L104 C107, C152, R152, R153, C168, C166, C215 and line. If OK –> Change UEM
Yes
Check C151, R157 and line. If OK –> Change UEM, retest.. If fail, change UPP
Audio faults 3

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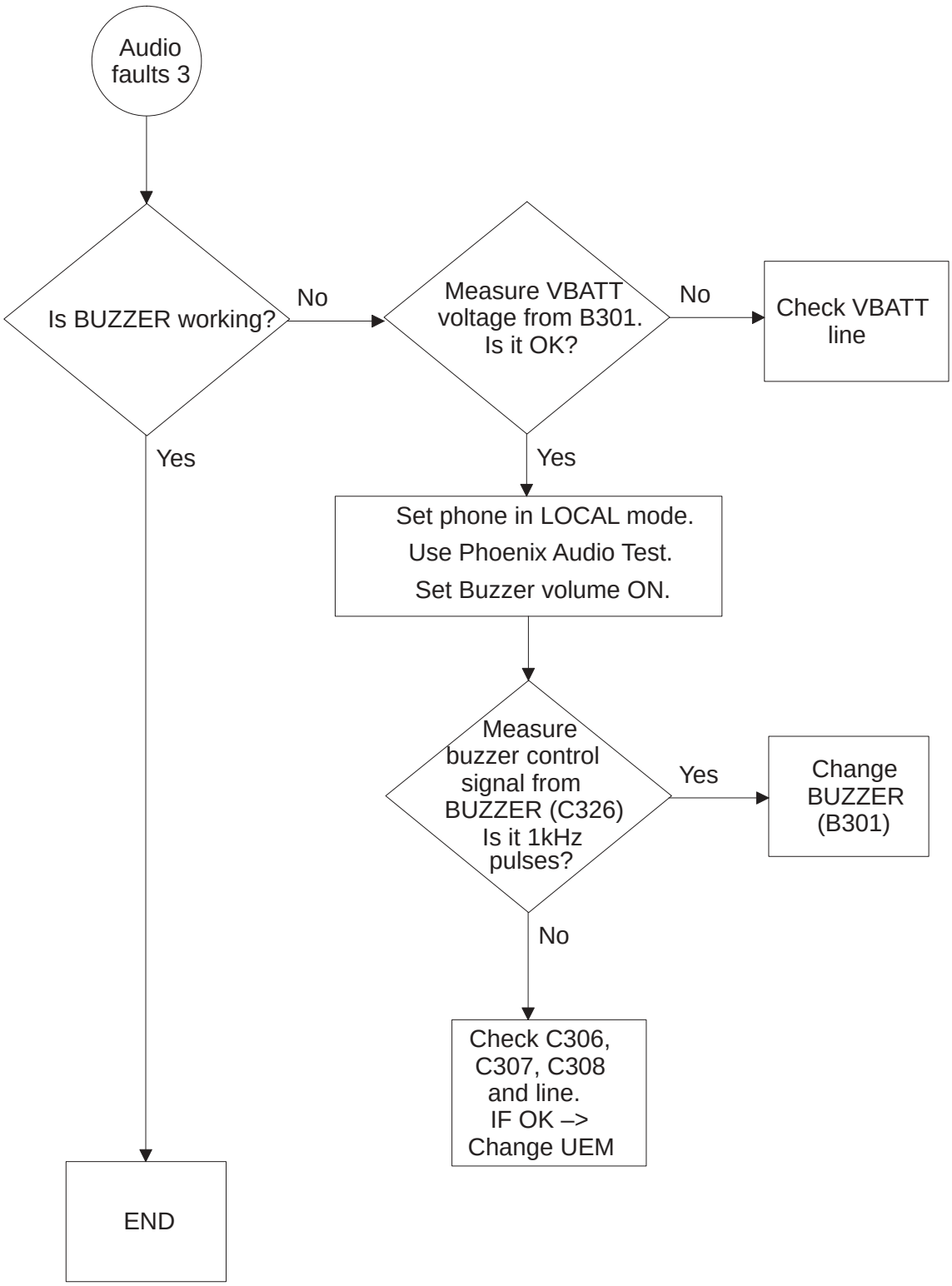
Audio troubleshooting 3

Figure 3:



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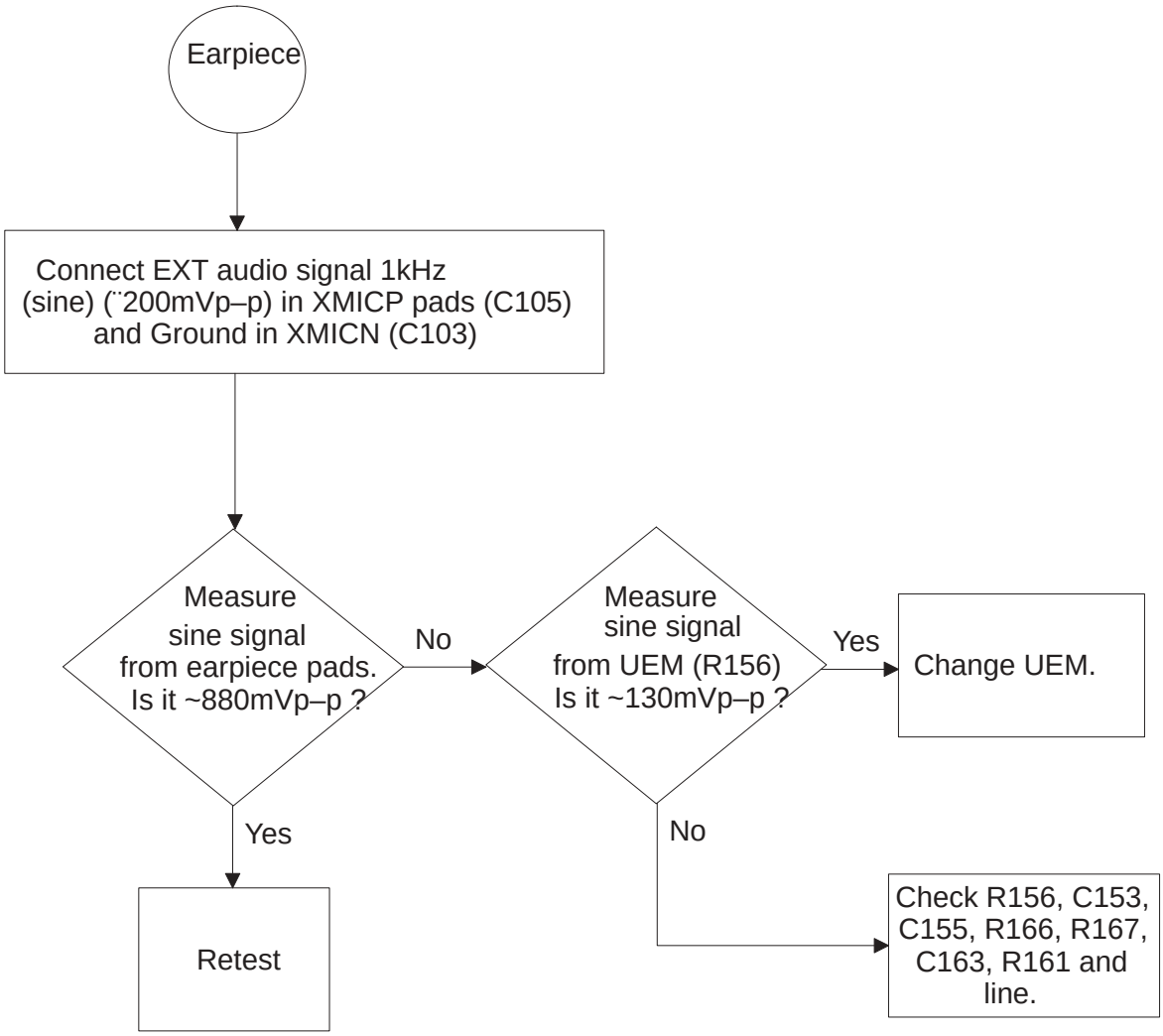
Earpiece troubleshooting

Figure 4:


Earpiece
Connect EXT audio signal 1kHz (sine) (¨200mVp–p) in XMICP pads (C105) and Ground in XMICN (C103)
Measure sine signal from earpiece pads. Is it ~880mVp–p ?
No
Measure sine signal from UEM (R156) Is it ~130mVp–p ?
Yes
Change UEM.
Yes
Retest
No
Check R156, C153, C155, R166, R167, C163, R161 and line.

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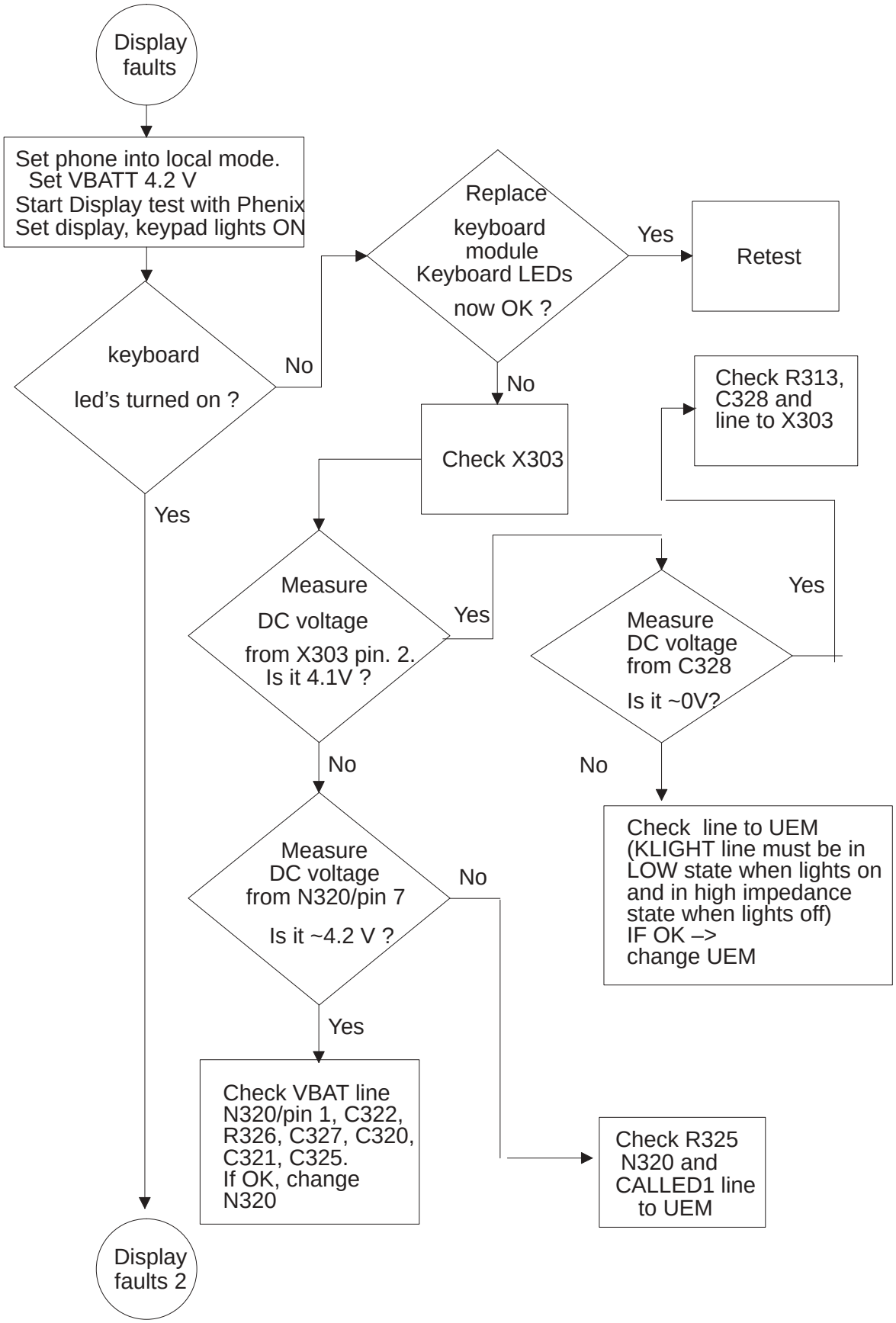
Display troubleshooting 1

Figure 5:


Display faults
Set phone into local mode.
Set VBATT 4.2 V
Start Display test with Phenix
Set display, keypad lights ON
keyboard led's turned on ?
No
Yes
Replace keyboard module Keyboard LEDs now OK ?
Yes
Retest
No
Check X303
Check R313, C328 and line to X303
Measure DC voltage from X303 pin. 2. Is it 4.1V ?
Yes
No
Measure DC voltage from C328 Is it ~0V?
Yes
No
Check line to UEM (KLIGHT line must be in LOW state when lights on and in high impedance state when lights off) IF OK –> change UEM
Measure DC voltage from N320/pin 7 Is it ~4.2 V ?
No
Yes
Check VBAT line N320/pin 1, C322, R326, C327, C320, C321, C325. If OK, change N320
Check R325 N320 and CALLED1 line to UEM
Display faults 2

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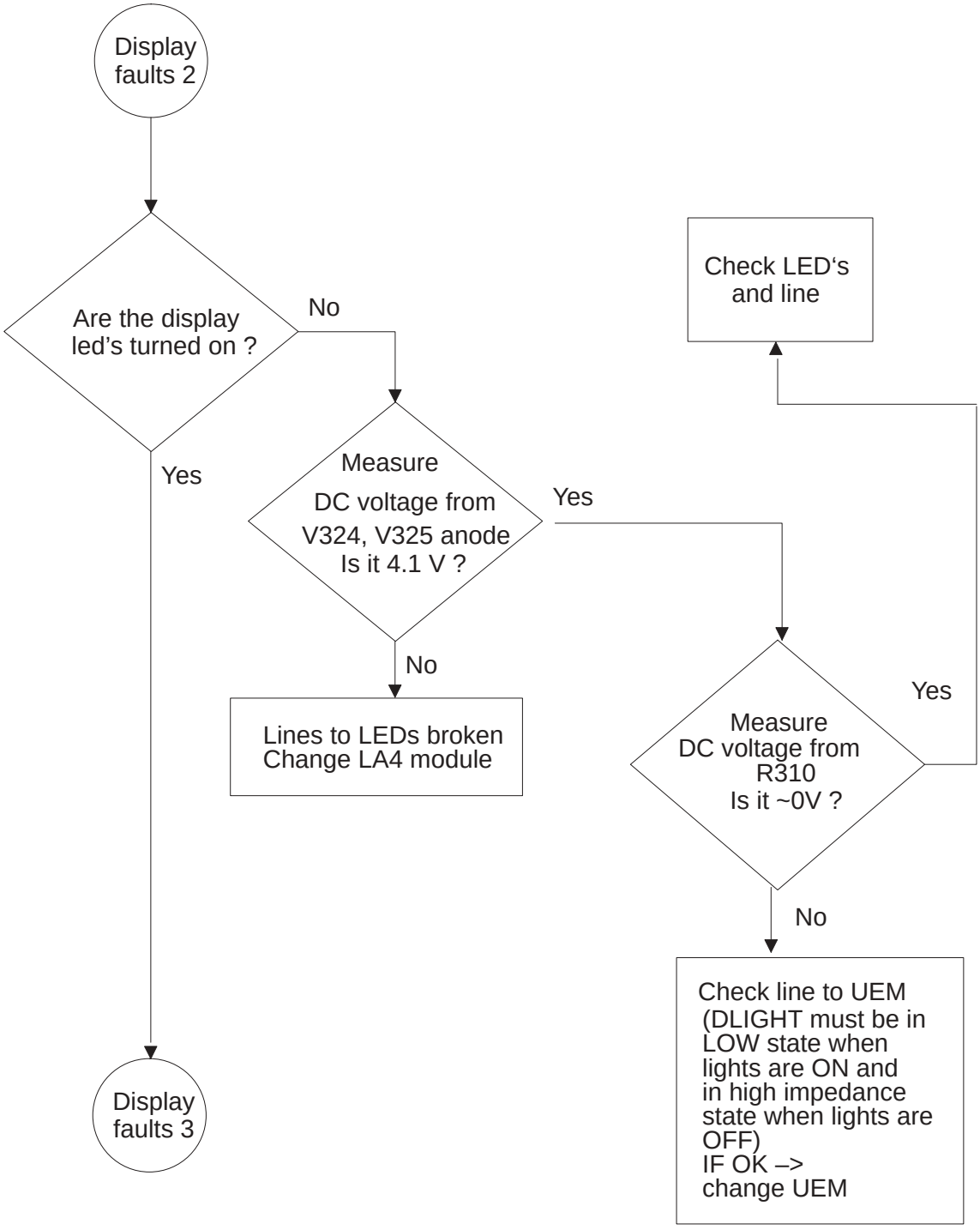
Display troubleshooting 2

Figure 6:


Display faults 2
Are the display led's turned on ?
No
Yes
Measure DC voltage from V324, V325 anode Is it 4.1 V ?
Yes
No
Lines to LEDs broken Change LA4 module
Check LED's and line
Measure DC voltage from R310 Is it ~0V ?
Yes
No
Check line to UEM (DLIGHT must be in LOW state when lights are ON and in high impedance state when lights are OFF) IF OK –> change UEM
Display faults 3

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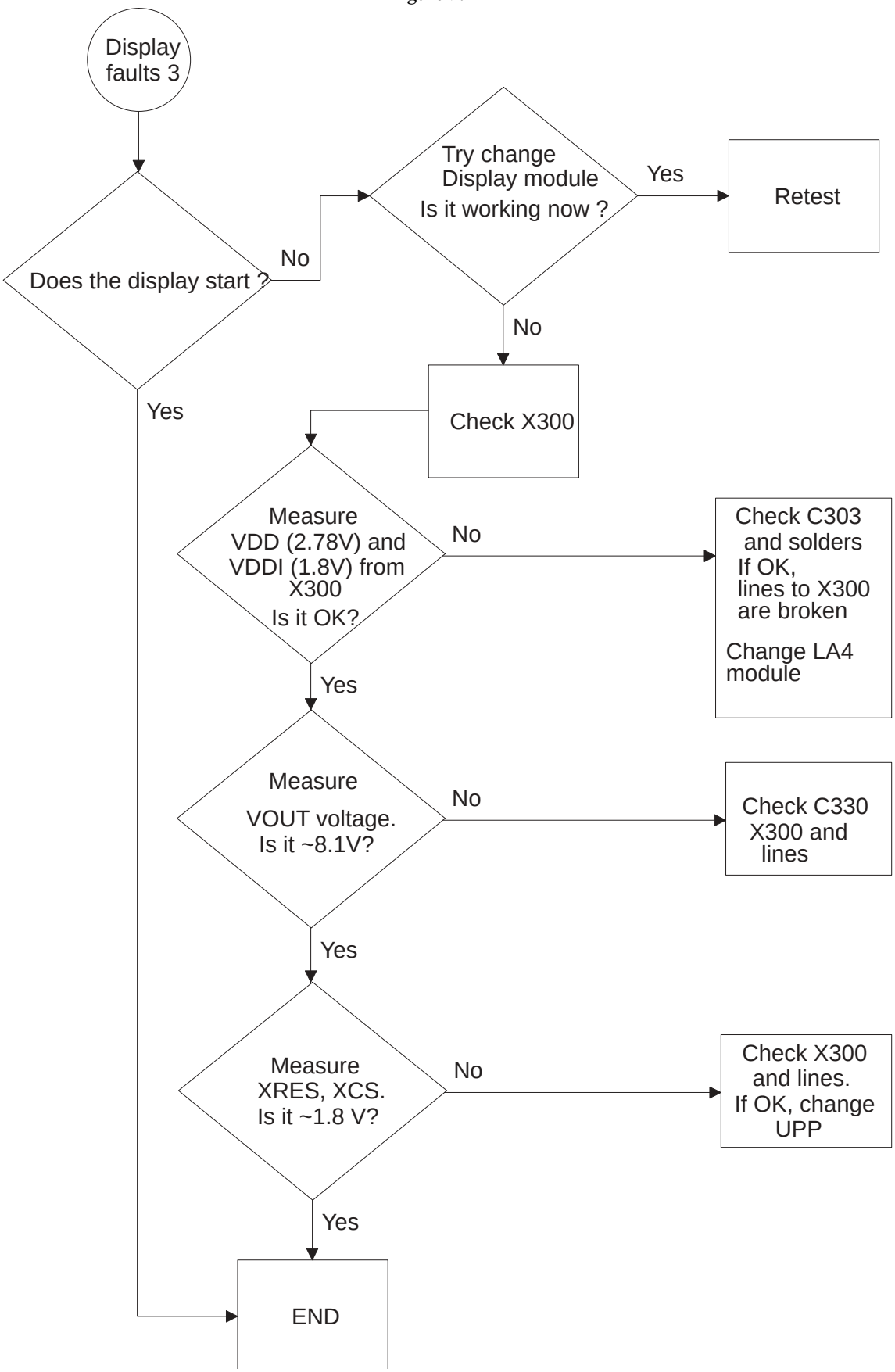
Display troubleshooting 3

Figure 7:



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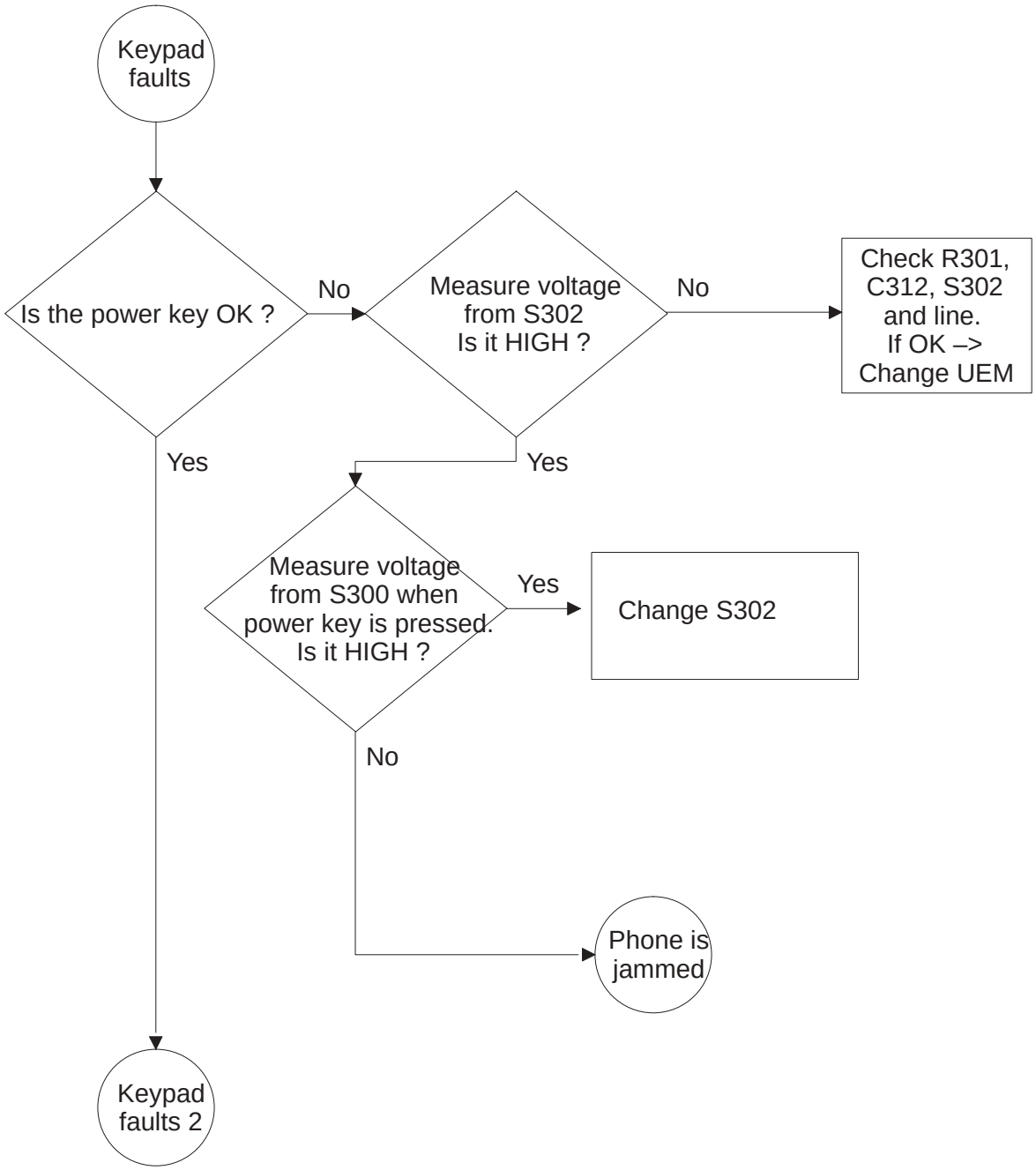
Keypad troubleshooting 1

Figure 8:



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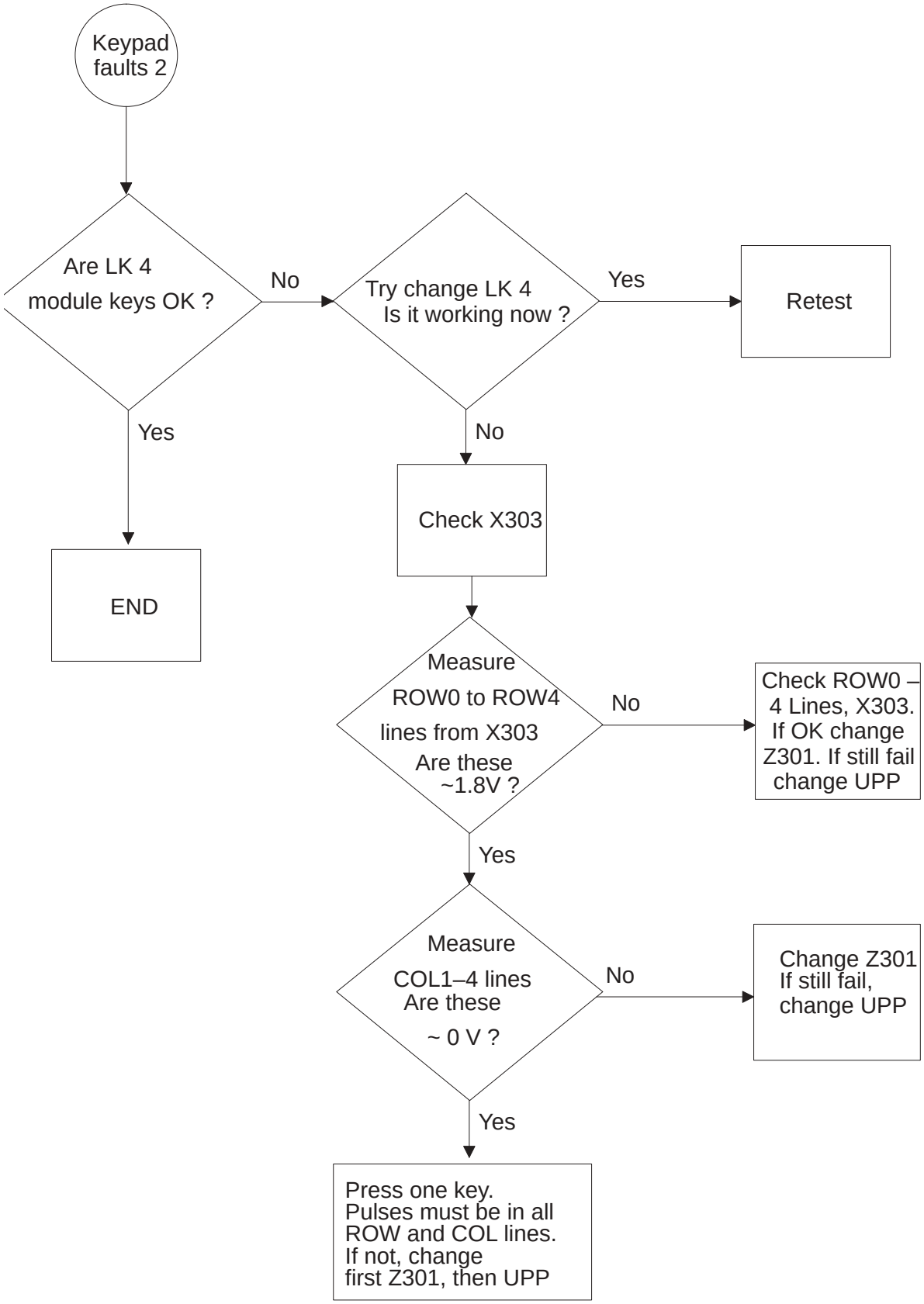
Keypad troubleshooting 2


Keypad faults 2
Are LK 4 module keys OK ?
No
Try change LK 4 Is it working now ?
Yes
Retest
Yes
END
No
Check X303
Measure ROW0 to ROW4 lines from X303 Are these ~1.8V ?
No
Check ROW0 – 4 Lines, X303. If OK change Z301. If still fail change UPP
Yes
Measure COL1–4 lines Are these ~ 0 V ?
No
Change Z301 If still fail, change UPP
Yes
Press one key. Pulses must be in all ROW and COL lines. If not, change first Z301, then UPP

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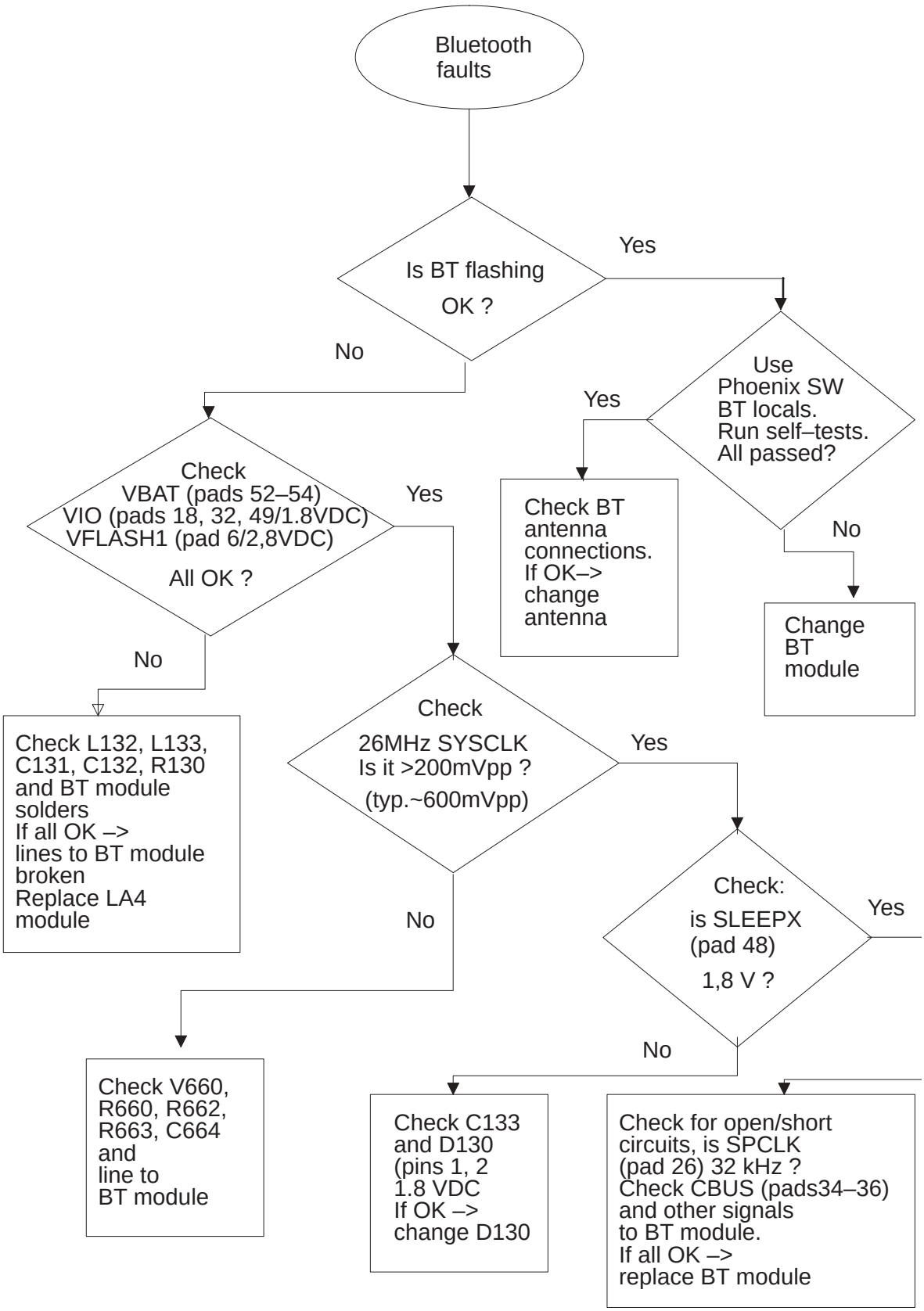
Bluetooth troubleshooting

Figure 9:


Bluetooth faults
Is BT flashing OK ?
Yes
No
Use Phoenix SW BT locals. Run self–tests. All passed?
Yes
No
Check BT antenna connections. If OK–> change antenna
Change BT module
Check VBAT (pads 52–54) VIO (pads 18, 32, 49/1.8VDC) VFLASH1 (pad 6/2,8VDC) All OK ?
Yes
No
Check L132, L133, C131, C132, R130 and BT module solders If all OK –> lines to BT module broken Replace LA4 module
Check 26MHz SYSCLK Is it >200mVpp ? (typ.~600mVpp)
Yes
No
Check: is SLEEPX (pad 48) 1,8 V ?
Yes
No
Check V660, R660, R662, R663, C664 and line to BT module
Check C133 and D130 (pins 1, 2 1.8 VDC If OK –> change D130
Check for open/short circuits, is SPCLK (pad 26) 32 kHz ? Check CBUS (pads34–36) and other signals to BT module. If all OK –> replace BT module

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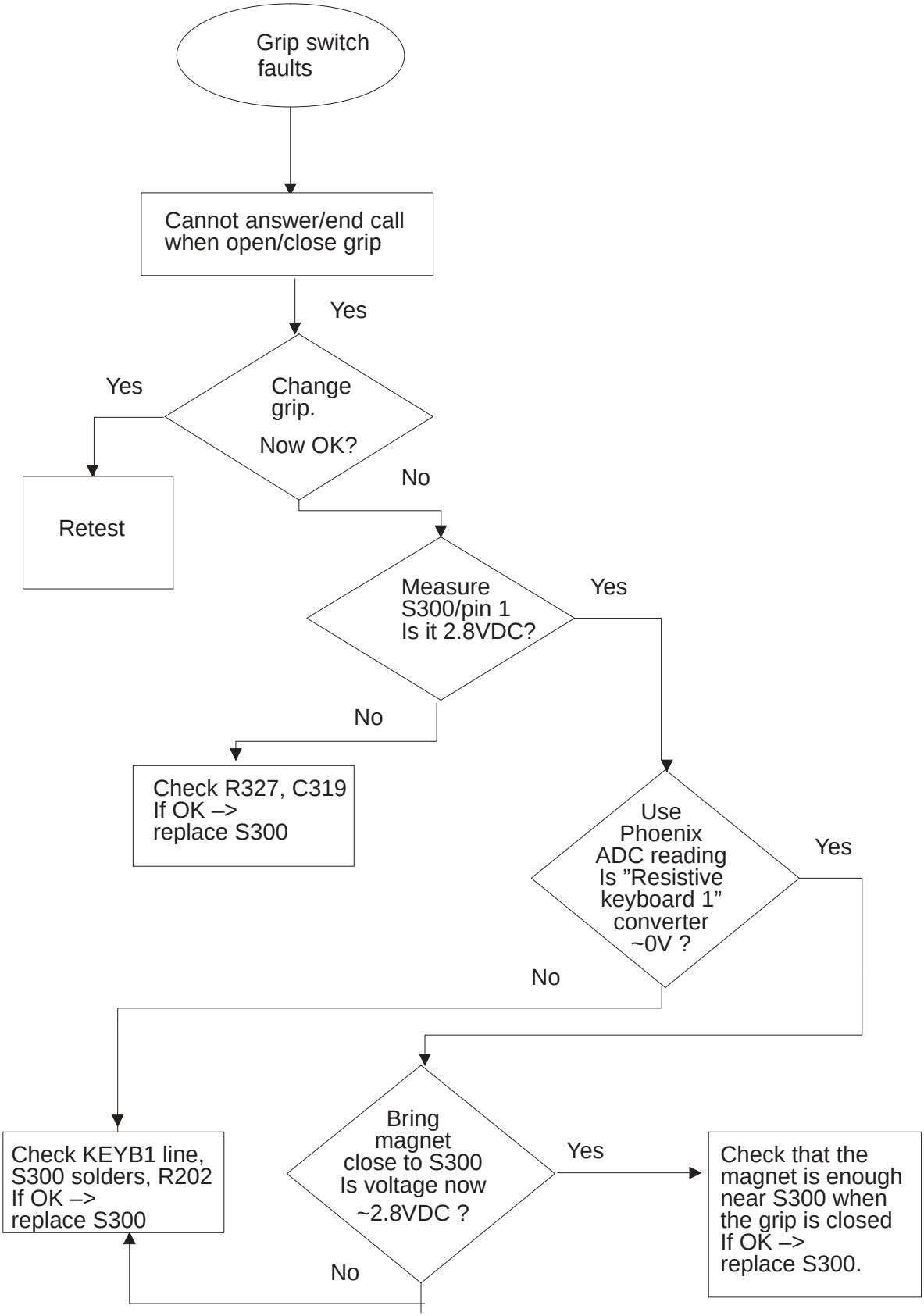
Grip switch troubleshooting

Figure 10:


Grip switch faults
Cannot answer/end call when open/close grip
Yes
Change grip.
Now OK?
Yes
Retest
No
Measure S300/pin 1 Is it 2.8VDC?
Yes
No
Check R327, C319 If OK –> replace S300
Use Phoenix ADC reading Is ”Resistive keyboard 1” converter ~0V ?
Yes
No
Check KEYB1 line, S300 solders, R202 If OK –> replace S300
Bring magnet close to S300 Is voltage now ~2.8VDC ?
Yes
No
Check that the magnet is enough near S300 when the grip is closed If OK –> replace S300.

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RF Troubleshooting

Introduction

Measurements must be done using spectrum analyzer with high-frequency high-impedance passive probe (LO-/reference frequencies and RF power levels) and oscilloscope with a 10:1 probe (DC-voltages and low frequency signals).

The RF-section is build around one RF-ASIC (HAGAR N600). Before changing HAGAR, please check following things: Supply voltages are OK and serial communication coming from baseband to HAGAR.

Please note: Grounding of the PA module is directly below PA module making it difficult to check or change. **Most RF semiconductors are static discharge sensitive!** So ESD protection must be taken care of during repair (ground straps and ESD soldering irons). HAGAR and PA are moisture sensitive and must be pre-baked prior to soldering.

Troubleshooting discrete components (resistors, inductors and capacitors) is done by checking component soldering. Capacitors can be checked for shortening and resistor values using an ohmmeter, but re member in-circuit measurements are evaluated with caution.

Remember that all measured voltages or RF levels in this document are rough figures. Especially RF levels vary due to different measuring equipment or different probe grounding used. When using RF probe it is good to use metallic tweezers to connect probe ground to PWB ground as close to measurement point as possible.

Transmitter

General instructions

Connect test jig to computer with DAU-9S cable or to FPS-8 Flash Prommer with XCS-4 modular cable.

Make sure that you have PKD-1 dongle connected to computers parallel port.

Connect DC power supply to module test jig with FLC-2 cable.

NOTE: When repairing or tuning transmitter use external DC supply with at least 3A current capability. Set the DC supply voltage to 3.9V and set the jumper connector on test jig to "bypass" position.

Connect RF-cable to the module test jig (MJS-46) RF connector and to measurement equipment or at least 10dB attenuator, otherwise the PA may be damaged. Normally spectrum analyzer is used as measurement equipment.

NOTE: Normally Spectrum analyzer maximum input power is +30dBm. It is recommended to use 10dB attenuator on Spectrum analyzer input to prevent damage.

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Set the phone module to test jig and start Phoenix service software.

Initialize connection to phone. (use FBUS driver when using DAU9S and COMBOX driver when using FPS-8)

Select product from the menu: File -> Choose product -> NHM-4

From toolbar set operating mode to "Local".

Activate RF controls window from the menu:

Maintenance -> Tuning -> RF Controls

From the RF controls window:

- Select band "GSM900" or "GSM 1800" (Default = "GSM900")

- Set Active unit to "Tx" (Default = "Rx")

- Set Operation mode to "Burst" (Default = "Burst")

- Set Tx data type to "Random" (Default = "All1")

- Set Rx/Tx channel to 37 on GSM900 band or 700 on GSM1800 band

  (Defaults)

- Set Tx PA mode to "Free" (Default)

- Set power level to 5 (Default = 19) on GSM900 or to 0 (Default = 15)

 on GSM1800

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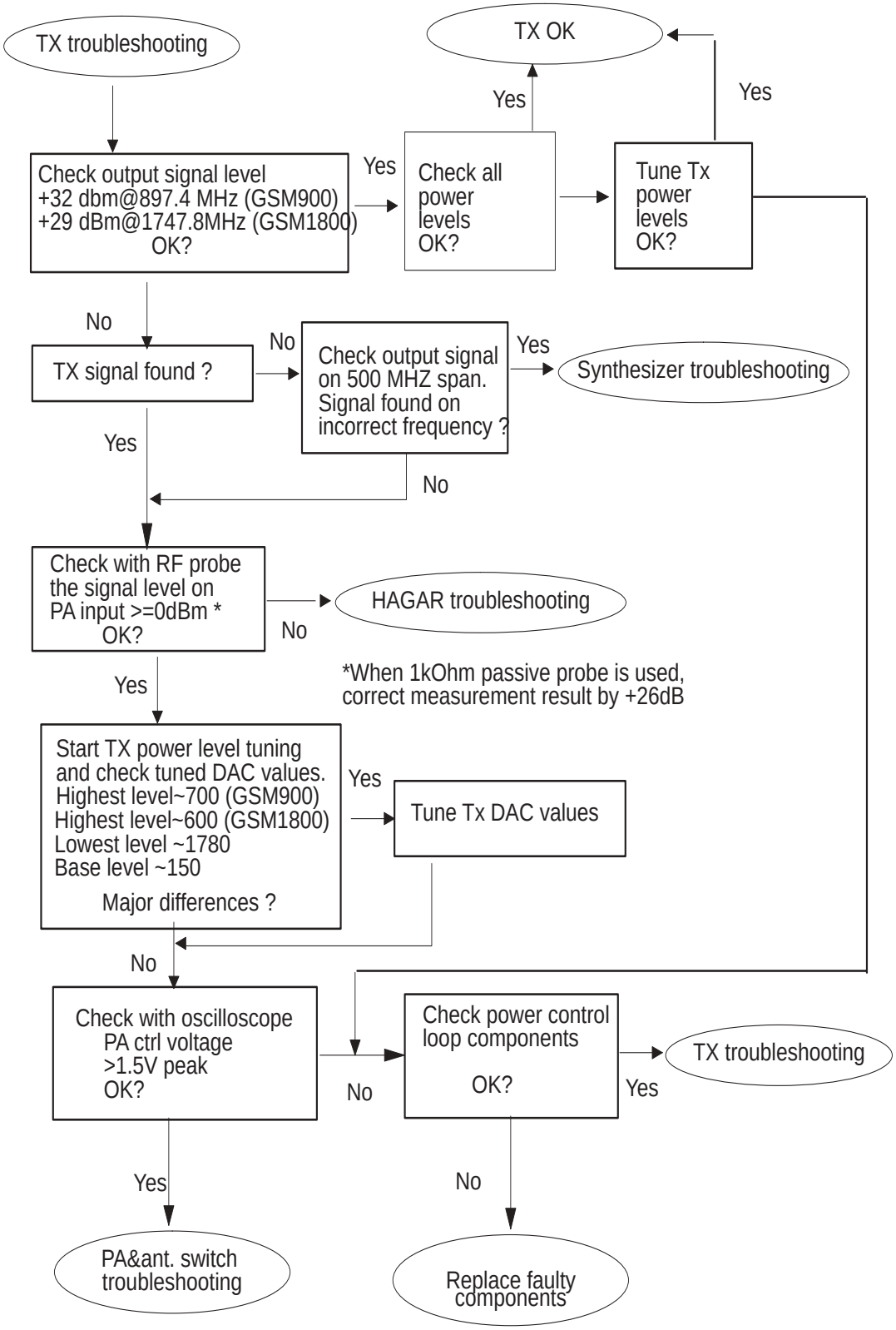
Transmitter troubleshooting diagram

Figure 1: Transmitter troubleshooting



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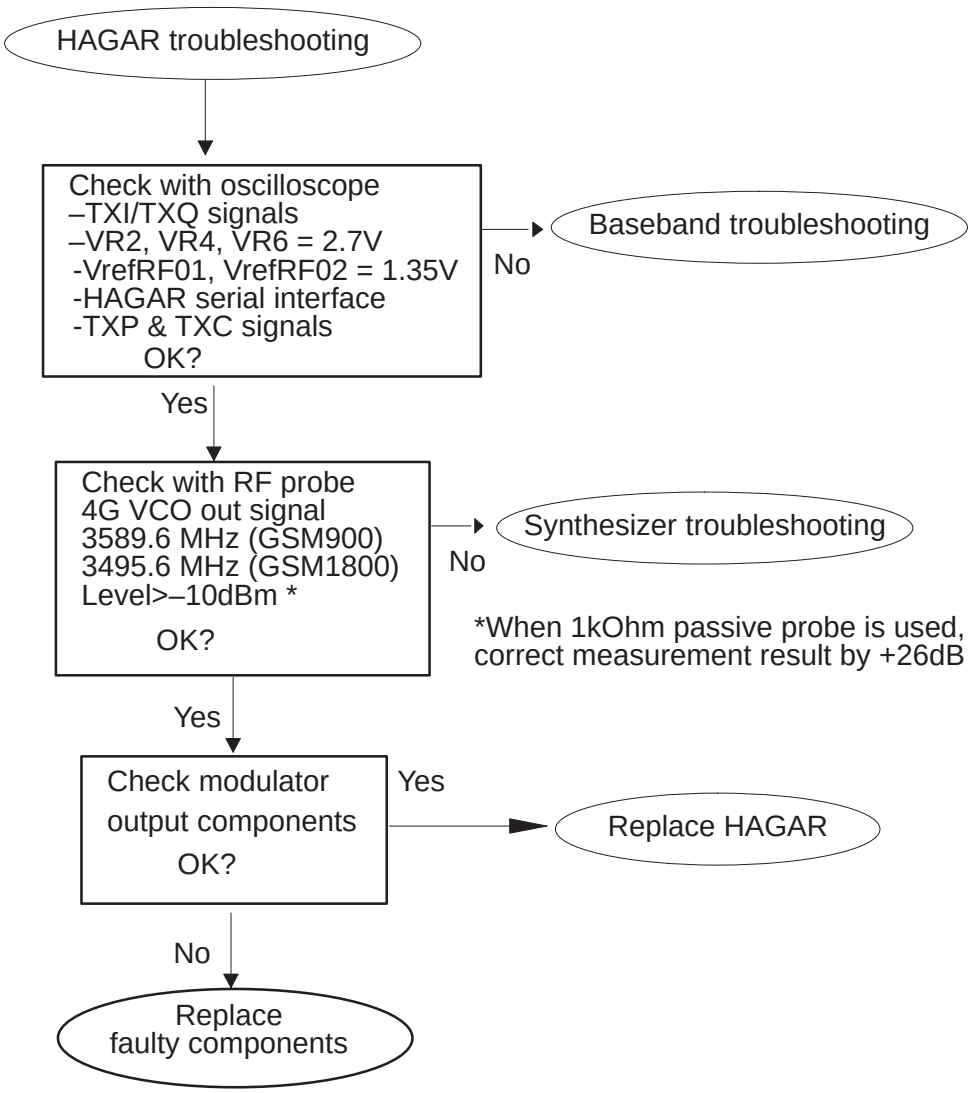
Hagar troubleshooting

Figure 2: Hagar troubleshooting



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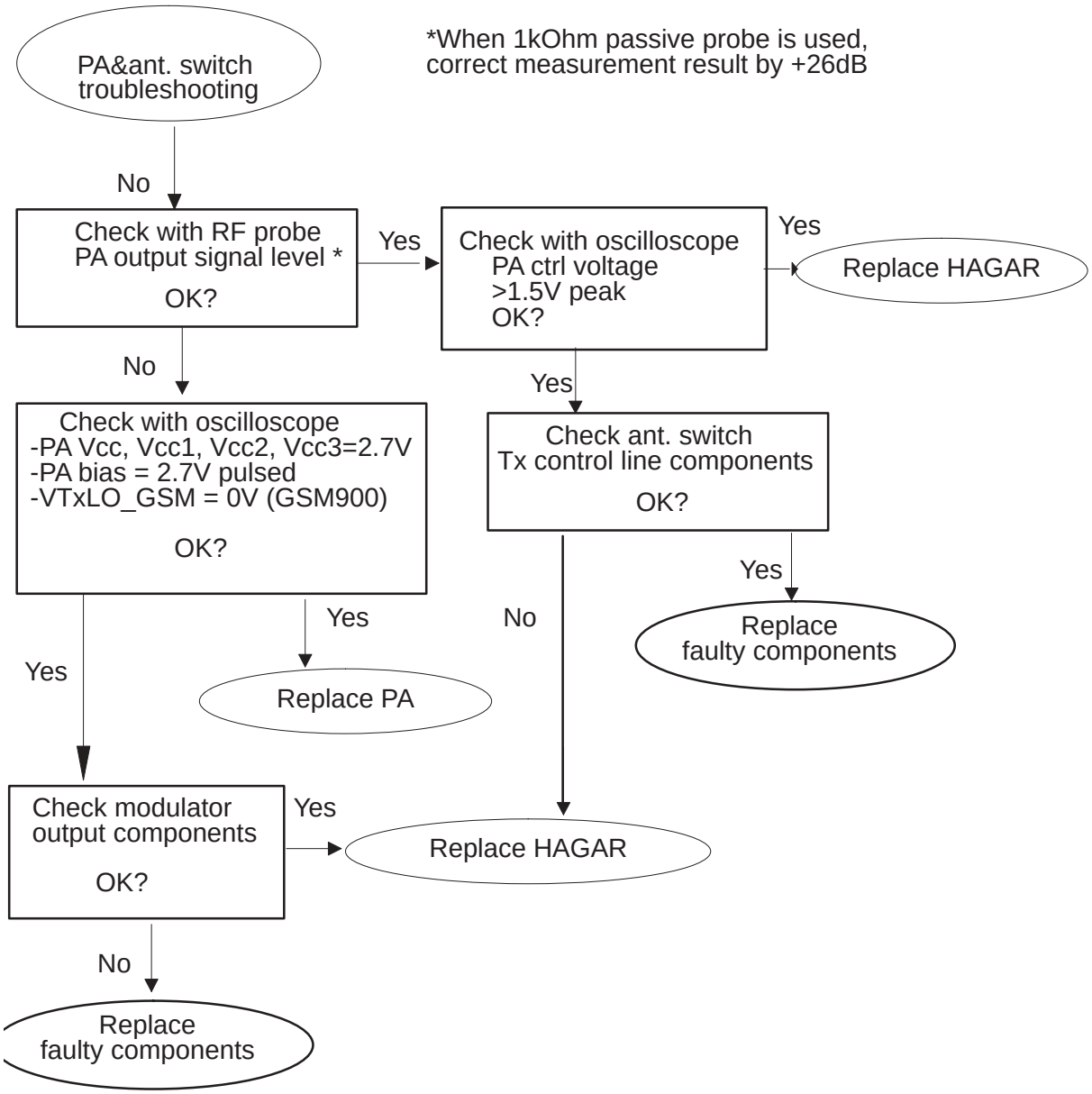
PA & Antenna switch troubleshooting

Figure 3: PA & Antenna Switch



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Transmitter signals

Figure 4: Left: TX_I_O, TX on, random data, burst mode.
Right: TX_Q_O, TX on, random data, burst mode.

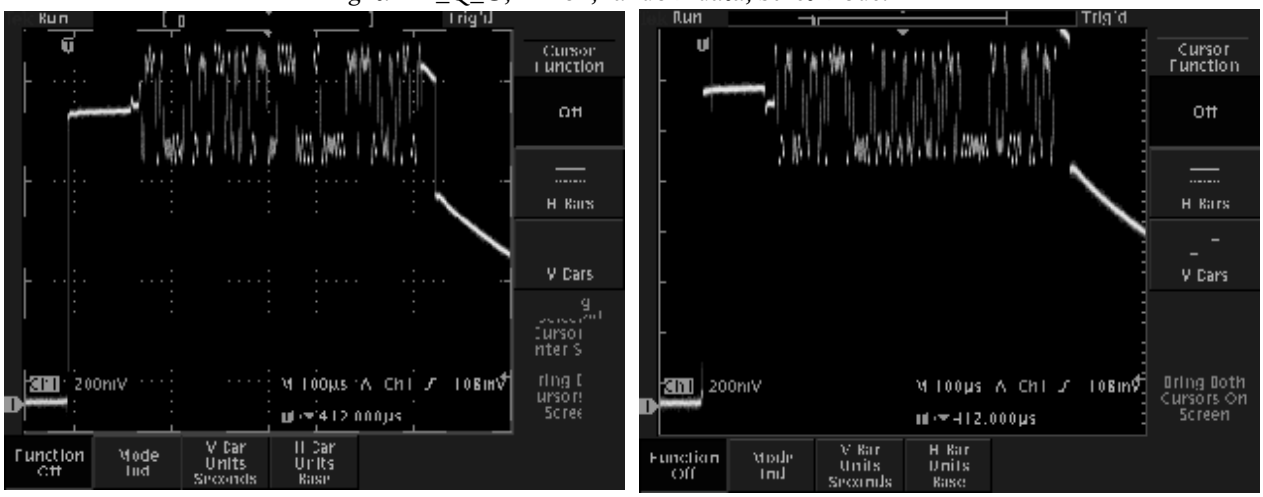

Figure 5: 900/1800 antsw tx contr, Tx on, Burst mode

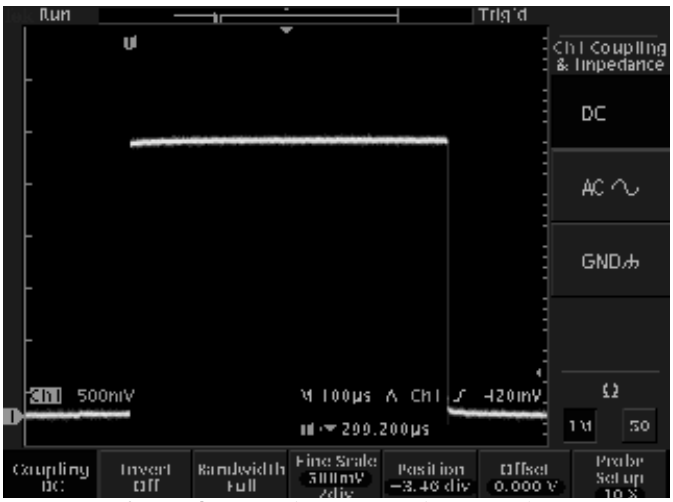

Figure 6: Left: 900/1800 PA bias, Tx on, burst mode.
Right: 900/1800 PA ctrl, Tx on, burst mode, high power level.

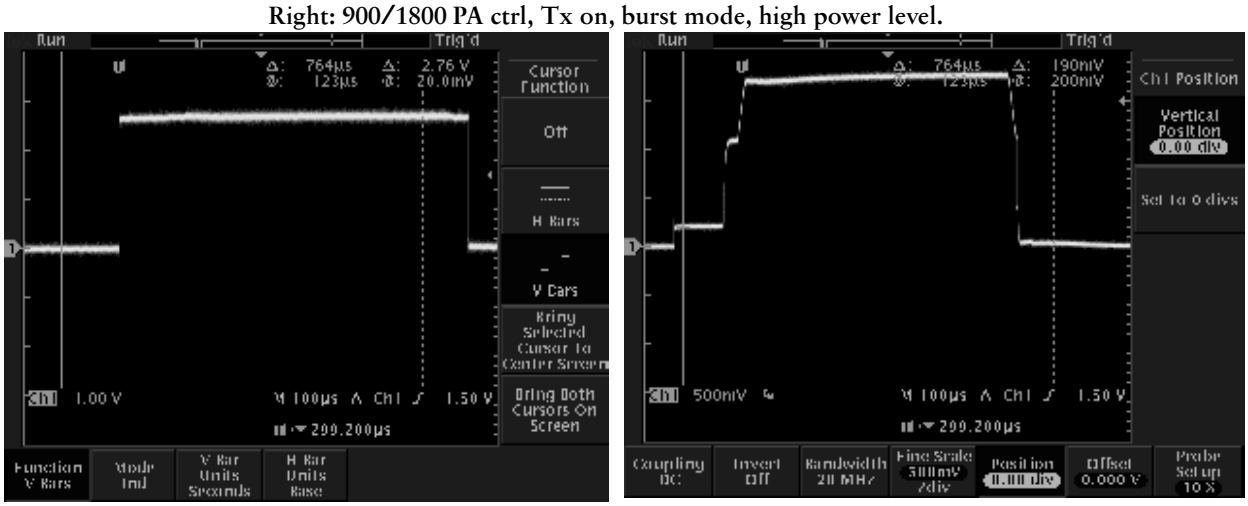

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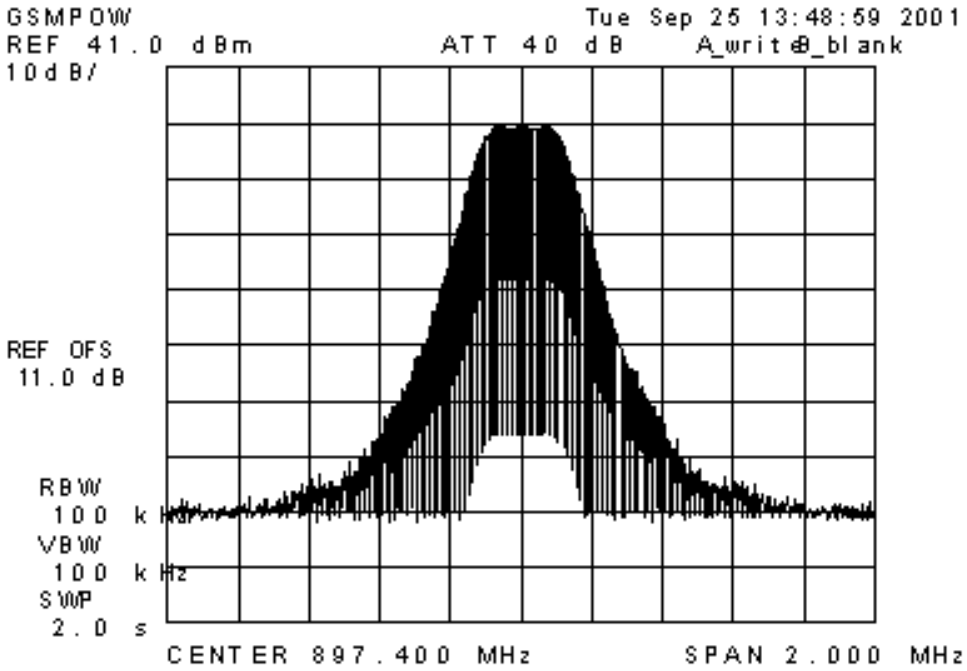
Figure 7: Tx out signal, 900 band, burst mode, channel 37



Receiver

General instructions

Connect the test jig to the computer with DAU-9S cable or to FPS-8 Flash Prommer with XCS-4 modular cable. Make sure that you have PKD-1 dongle connected to the parallel port of the computer.

Connect the DC power supply to the module test jig with FLC-2 cable. Set the DC supply voltage to 3.9V and set the jumper connector on the test jig to "bypass" position.

Connect RF-cable to the module test jig (MJS-46) RF connector and to RF signal generator.

Set the phone module in the test jig and start the Phoenix service software.

Initialize the connection to the phone. Use the FBUS driver when using DAU9S and COMBOX driver when using FPS-8.

Choose the product from the menu: File -> Choose product -> NHM-4.

From the toolbar set operating mode to "Local".

Activate RF controls window from the menu: Maintenance -> Testing -> RF Controls.

From the RF controls window:

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- Select band "GSM900" or "GSM 1800" (Default = "GSM900")

- Set Active unit to "Rx" (Default = "Rx")- Set Operation mode to

  "Continuous" (Default = "Burst")

- Set AGC to "8: FEG ON + 46 dB (Default = "8: FEG ON + 46 dB")

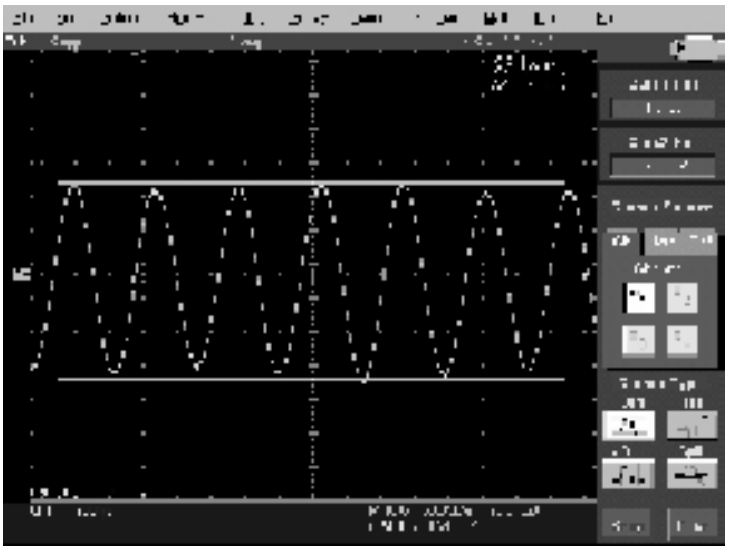
- Set Rx/Tx channel to 37 on GSM900 band or 700 on GSM1800 band

  (Defaults)

Apply 942.46771 MHz (channel 37 + 67.710 kHz offset) or 1842.86771 MHz (channel 700 + 67.710 kHz offset) -90 dBm signal to the RF-connector (remember to compensate for cable attenuation).

Measuring with an oscilloscope on "RX_I" or "RX_Q" this picture should be seen on a working GSM900 or GSM1800 receiver:

Figure 8:



Signal amplitude is 700 mVpp, DC offset 1.35 V and frequency 67 kHz. If this picture is not seen, continue to the next page.

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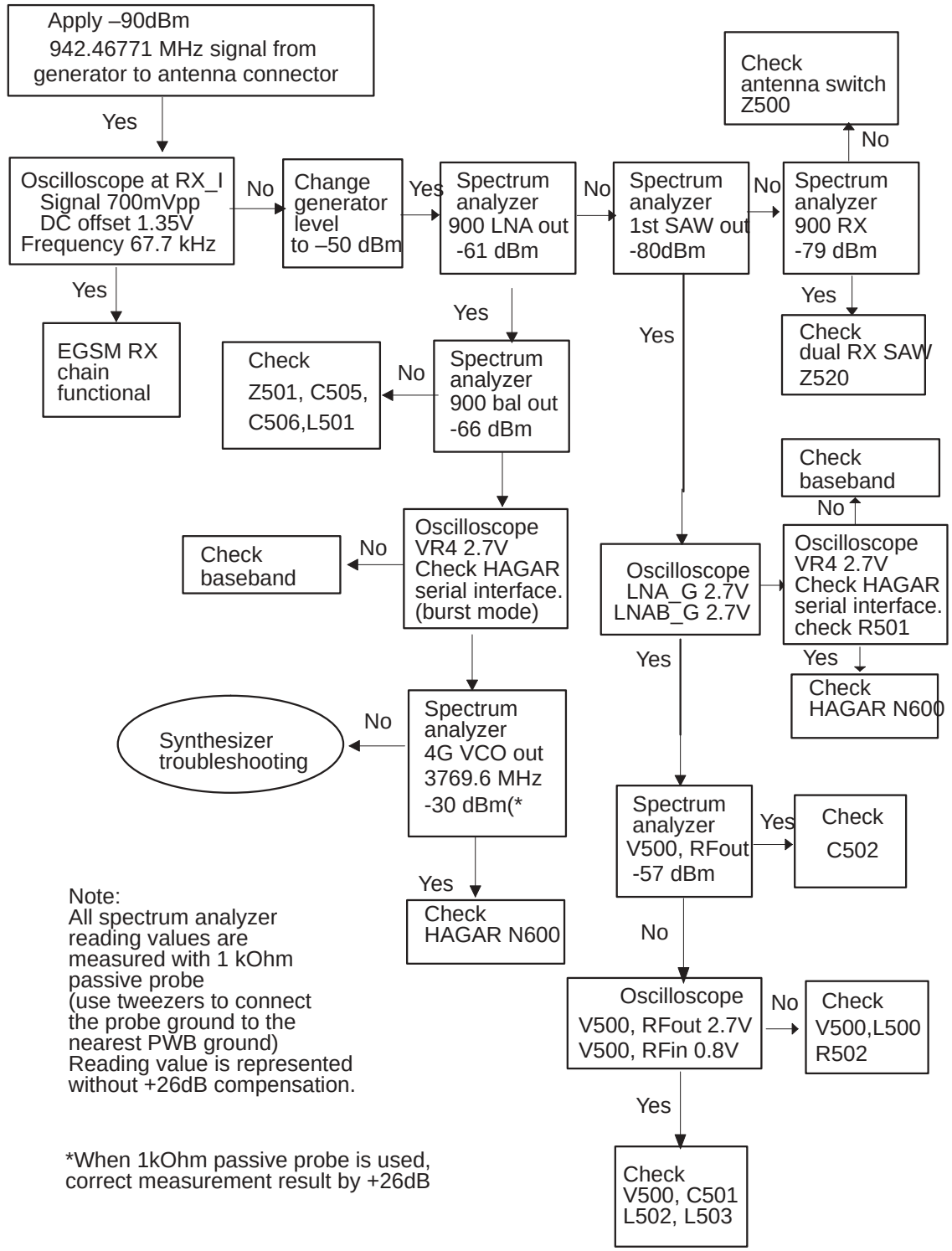
Receiver troubleshooting diagram for GSM900

Figure 9:



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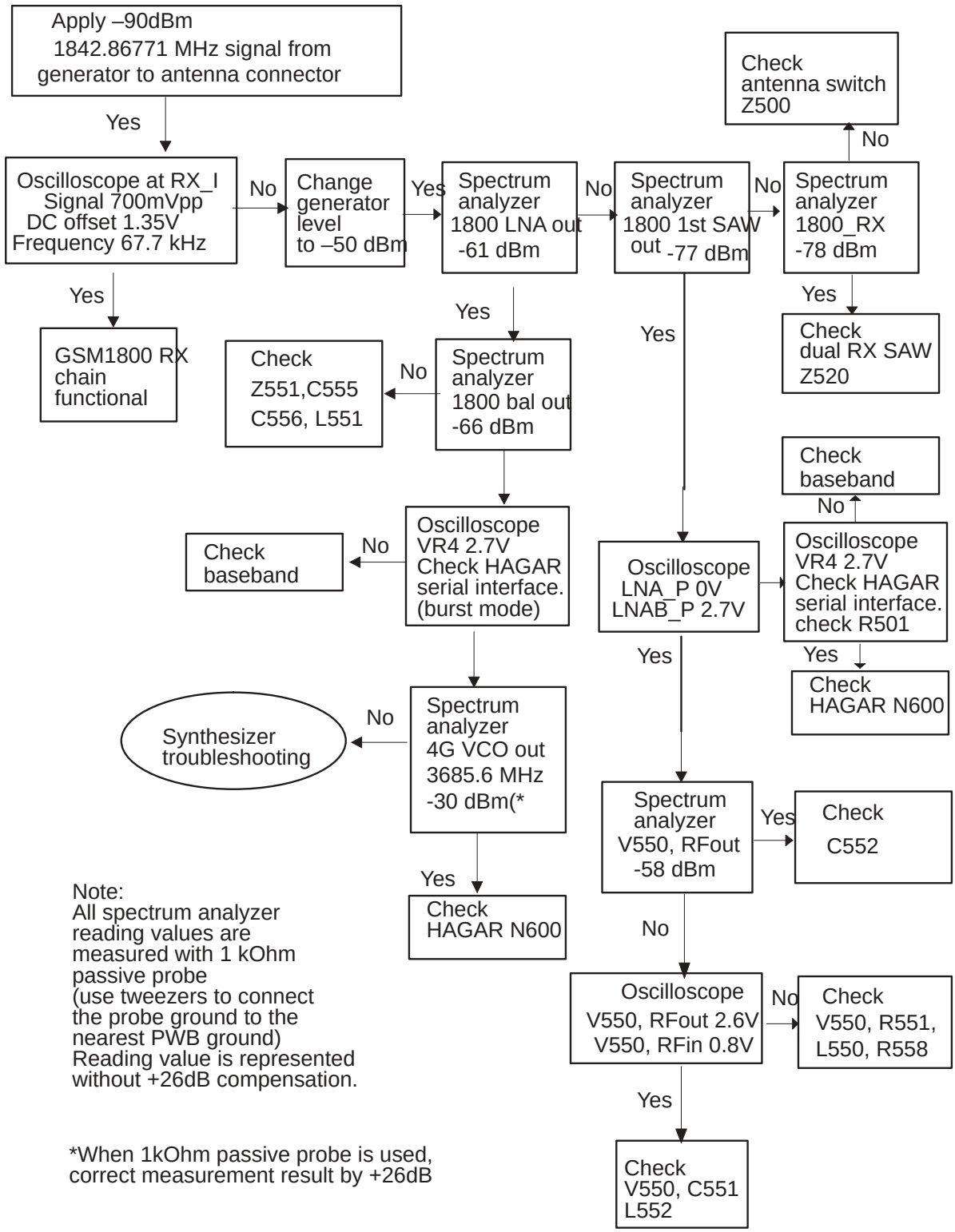
Receiver troubleshooting diagram for GSM1800

Figure 10:



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LNA gainstep checking GSM900 & GSM1800

900 LNA out	1800 LNA out
- RF-level at antenna port e.g. -50 dBm - RX continuous mode (local mode) - difference between AGC -settings "FEG on" and "FEG off" roughly 25 dB (using 250 ohm passive RF-probe)	- RF-level at antenna port e.g. -50 dBm - RX continuous mode (local mode) - difference between AGC -settings "FEG on" and "FEG off" roughly 30 dB (using 250 ohm passive RF-probe)

LNAB_G	LNAB_P
- RX continuous mode (local mode) - 2,6 V DC voltage "FEG ON" - 0 V DC voltage "FEG OFF"	- RX continuous mode (local mode) - 2,7 V DC voltage "FEG ON" - 0 V DC voltage "FEG OFF"

LNA_G	1800 LNA_P
- RX continuous mode (local mode) - 2,7 V DC voltage "FEG ON" and "FEG OFF"	- RX continuous mode (local mode) - 0 V DC voltage "FEG ON" - 1.9 V DC voltage "FEG OFF"

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Synthesizer

General instructions

Connect test jig to computer with DAU-9S cable or to FPS-8 Flash Prommer with XCS-4 modular cable.

Make sure that you have PKD-1 dongle connected to computers parallel port.

Connect DC power supply or FPS-8 to module test jig with FLC-2 cable.

Set the DC supply voltage to 3.9V and set the jumper connector on test jig to "bypass" position.

Set the phone module to test jig and start Phoenix service software.

Initialize connection to phone. (use FBUS driver when using DAU-9S and COMBOX driver when using FPS-8)

Select product from the menu: File -> Choose product ->NHM-4

From toolbar set operating mode to "Local".

Activate RF controls window from the menu:

Maintenance -> Tuning -> RF Controls

From the RF controls window:

- Select band "GSM900" or "GSM 1800" (Default = "GSM900")

- Set Active unit to "Rx" (Default = "Rx")

- Set Operation mode to "Continuous" (Default = "Burst")

- Set Rx/Tx channel to 37 on GSM900 band or 700 on GSM1800 band

(Defaults)

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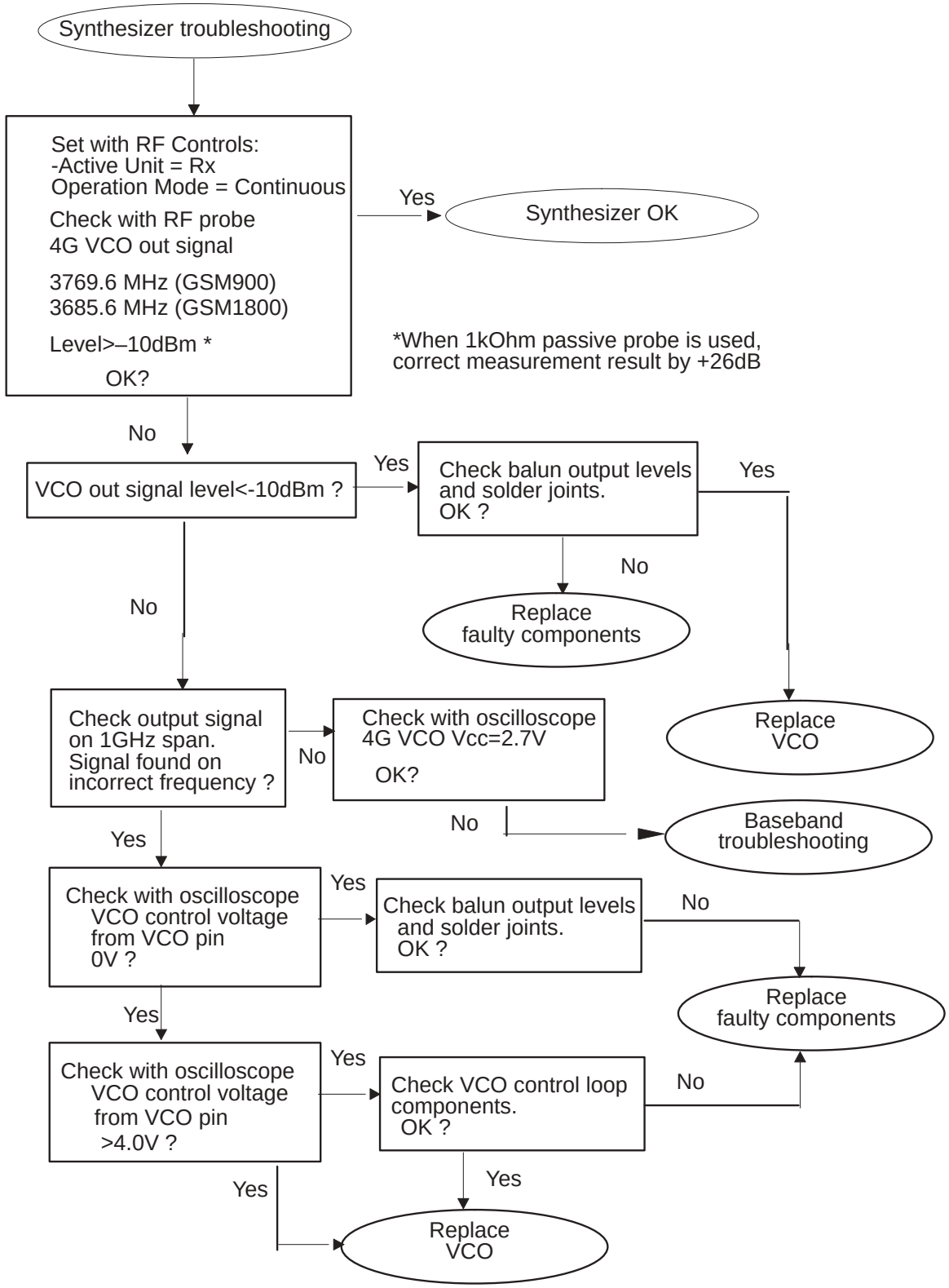
Synthesizer troubleshooting diagram

Figure 11:



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Synthesizer signals

Figure 12: Left: 26 MHz XO out, right: 13MHz clock

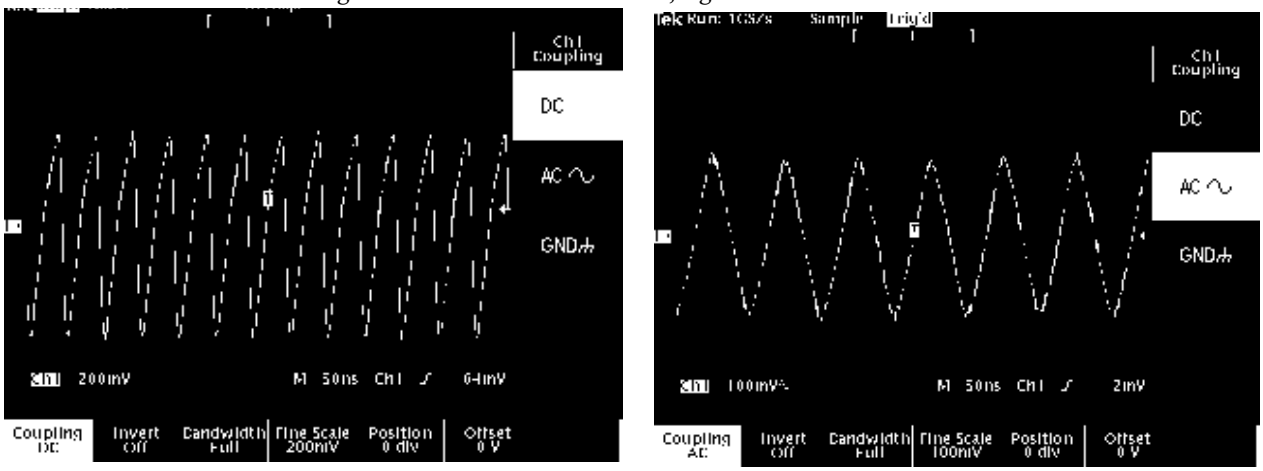

Figure 13: 4 GHz VCO ctrl. 900 Rx, channel 124, continuous mode

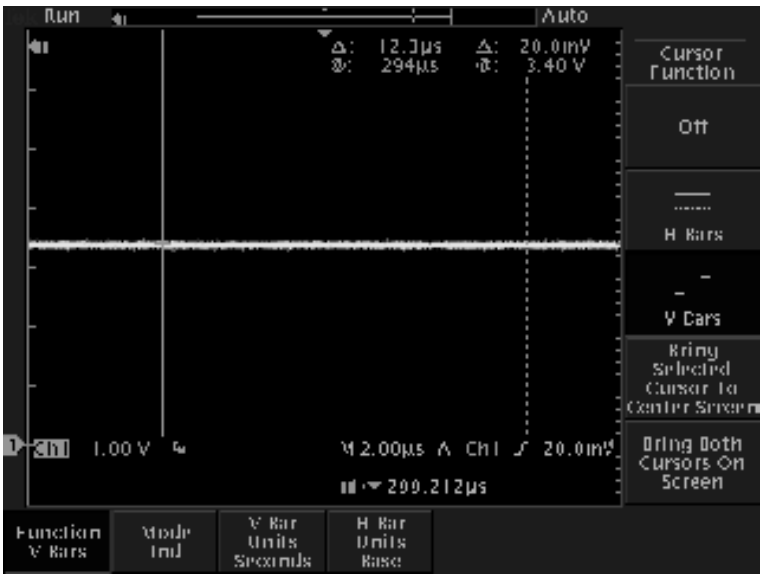

Figure 14: 4GHz VCO Ctrl, 1800 MHz, channel 512, continuous mode.

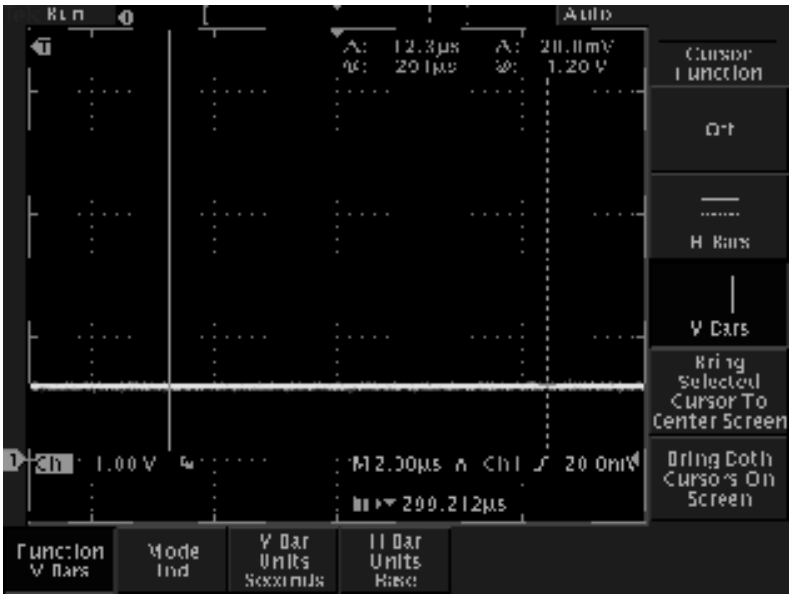

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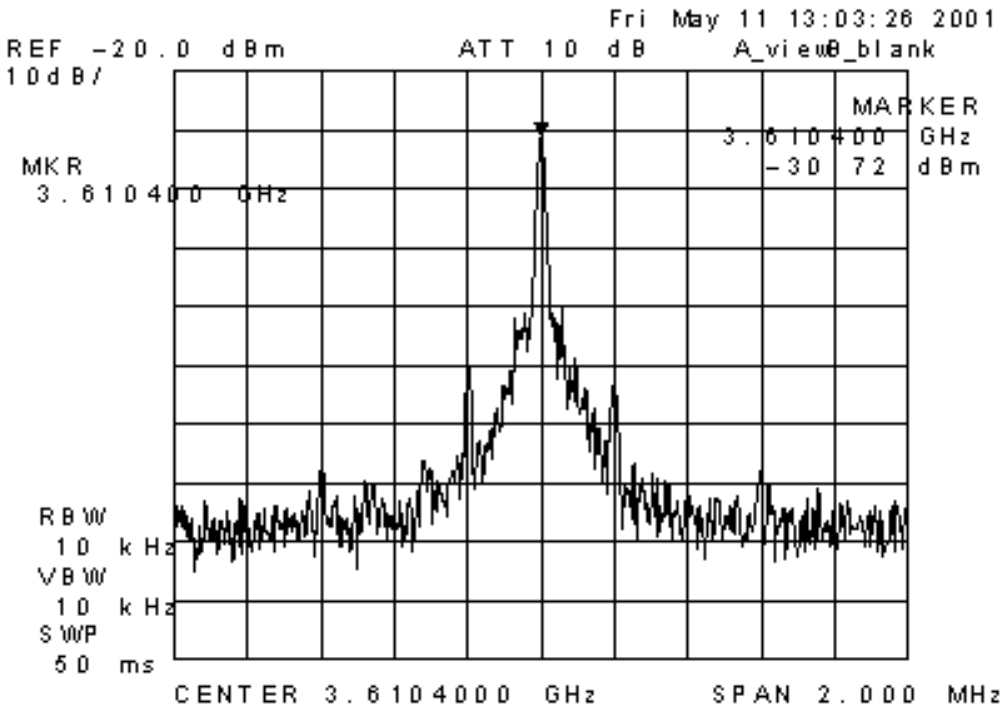
Figure 15: 4GHx VCO out



4GHz VCO output, 1800 band, RX on, continuous mode

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